MODERN PLASTICS

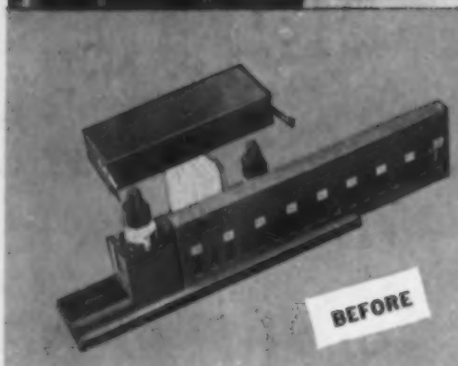
MAY 1949

It pays to use your custom molder's know-how

says the maker of Taylor "Comparators"

No. 5 in a series on Plastics Skill at Work . . .

W. A. Taylor, *Pres.*
W. A. Taylor & Co.



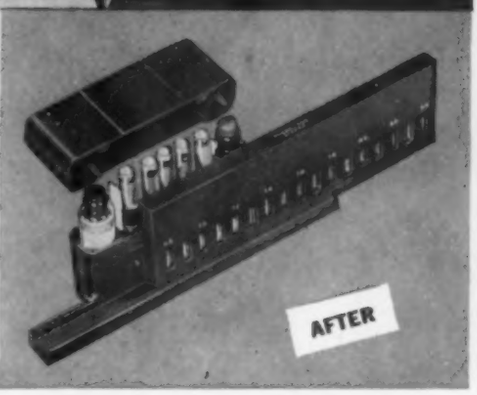
PROJECT: Five-part Slide, Body and Cover for pH and Chlorine Control Device

CUSTOMER: W. A. Taylor & Co., Baltimore, Maryland

MOLDER: Plastics Division, Colt's Manufacturing Co.

MATERIAL: Compression Molded Durez Phenolic Plastic

IMPROVEMENTS: Reduced weight, faster assembly, improved appearance and wearing qualities, better talking points for salesmen



● Like other products of every conceivable kind, the *Comparators* made by W. A. Taylor & Co. were perfect . . . *until someone saw how to improve them.*

The "someone" in this case, which is so typical it might be duplicated in your own operation, was a custom molder working with Taylor planning executives.

These comparators were selling so fast to laboratories in 35 major industries that the maker grew concerned about production. The molder, Plastics Division of Colt's Mfg. Co., requested permission to redesign for improved speed of output, ease of use, and appearance. Experimentation with models evolved the present design, an all-round better product molded of Durez phenolic plastics.

Right away, the restyling in Durez reduced the weight by a third, lightening work for laboratory men everywhere. Weight is also balanced better in the Durez pieces, assembly in production is faster, and window cuts are more accurate. The plastic parts, being impervious to mild acids and alkalis, and to laboratory fumes, keep their lustrous look of newness indefinitely.

Durez field men, with an experience-backlog covering the entire progress of plastics, will gladly team up with you and your molders. Call on them freely.

Durez Plastics & Chemicals, Inc., 125 Walck Rd., N. Tonawanda, N. Y.

A new kit with plastics users everywhere is the handy "Durez Check-Chart." Write for yours. Durez Plastics & Chemicals, Inc., 125 Walck Rd., N. Tonawanda, N. Y.

DUREZ

PHENOLIC RESINS

- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

PHENOLIC PLASTICS THAT FIT THE JOB

ALL IS NOT GOLD THAT GLITTERS...MUCH IS *Catalin*

In the field of quality costume jewelry, imaginative minds are ever at work . . . conceiving smart designs, combining alluring colors, developing new effects . . . and adding immeasurably to the acceptance of their creations through the use of Catalin — the gem of plastics.

Because fashions change frequently, timeliness is of the utmost importance in producing costume jewelry. One of the many advantages of gem-like Catalin is, that new styles can be economically fabricated at a moments notice from stock sheets, rods, tubes and an almost limitless assortment of suitable shapes. The rich, deep, lustrous colors of Catalin Cast Resins make them fit perfectly into our ever-changing tempo of modern living. Catalin is equally effective used alone or when harmoniously combined with other materials.

On the quality mart, Suray, is currently exciting the feminine pulse with lightweight, exquisite flatteries in carved, engraved and partially gold plated Catalin earrings, bracelets, pins, cigarette holders. As indicated in the illustration, the technique involves both machine and handwork . . . the former, keeping costs down . . . the latter, imparting costume individuality — so essential in quality selling.

Whether fabricated from stock shapes or cast to customer specifications, the use of Catalin offers greater design flexibility — low *tooling up* costs.

For the touch that is one of incomparable beauty, investigate Catalin for your next product projection. Our service staff will welcome the pleasure of assisting you. Inquiries invited!

CATALIN CORPORATION OF AMERICA
One Park Avenue • New York 16, N. Y.

Catalin costume jewelry by Suray,
115 W. 52nd St., New York 19, N. Y.

CAST RESINS • LIQUID RESINS • MOLDING COMPOUNDS

MODERN PLASTICS*

VOLUME 26 MAY 1949 NUMBER 9

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Porch Furniture by Bunting Glider Co., Philadelphia, Pa.

Cohyde Upholstery by Cotan Corp., Newark, N. J.

THAT'S how the customers feel since the Bunting Glider Company upholstered its line of outdoor furniture with Cohyde containing Hycar. For this new plastic material has a long string of advantages porch sitters welcome.

Cohyde is a vinyl-type coated fabric in which Hycar, a nitrile type rubber, acts as the plasticizer. This new blend, besides producing a waterproof fabric that wears like elephant hide, won't crack or peel, and is actually resistant to flame. It is not injured by alcohol, acids, grease, oils or exposure to salt water. It never "bleeds" color onto your clothes and it never feels clammy, even in hot weather—thanks to Hycar!

What can Hycar do for you as a plasticizer or modifier for vinyls and other resins? This new development makes better products in many fields including upholstery, packaging, flooring, shoe, and paper.

If these uses for Hycar suggest an idea to you, or if you are interested in the many advantages this oil resistant rubber offers in the industrial field, let us know. You will find us eager to help. We make no finished products from Hycar but our technical service is always on hand to help you work out any special problems, or smooth the way for new applications. Write to B. F. Goodrich Chemical Company, Dept. N-5, Rose Bldg., Cleveland 15, Ohio. In Canada: Kitchener, Ontario.

Hycar

Reg. U.S. Pat. Off.

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EDITORIAL

Back To Custom Molding

Will the plastics molding industry continue to grow as an entity in its own right — or will it become a subservient auxiliary to other industries that now use large quantities of finished plastics parts?

We believe this question to be one of the most vexing of the many confronting this industry. In our own mind we are convinced that plastics molding is primarily a job for plastics molders; yet two manufacturers who each use a million dollars worth of plastics annually have just given us plausible reasons why they should install their own molding departments.

In turn, we gave them the story of a large manufacturer of phenolic molded toilet seats who did his own molding. Business became so good a couple of years ago that he added a few more presses. When the phenolic business began its decline in 1948, the company officials studied the circumstances and found that molders in their area could produce the job at less cost than their own molding department. Out went their presses — personnel was reduced from 60 to 20. The reduced staff handles the office work, attaches hardware to the molded pieces, and does the shipping. Life is simpler — more seats are being shipped — the profit margin has increased.

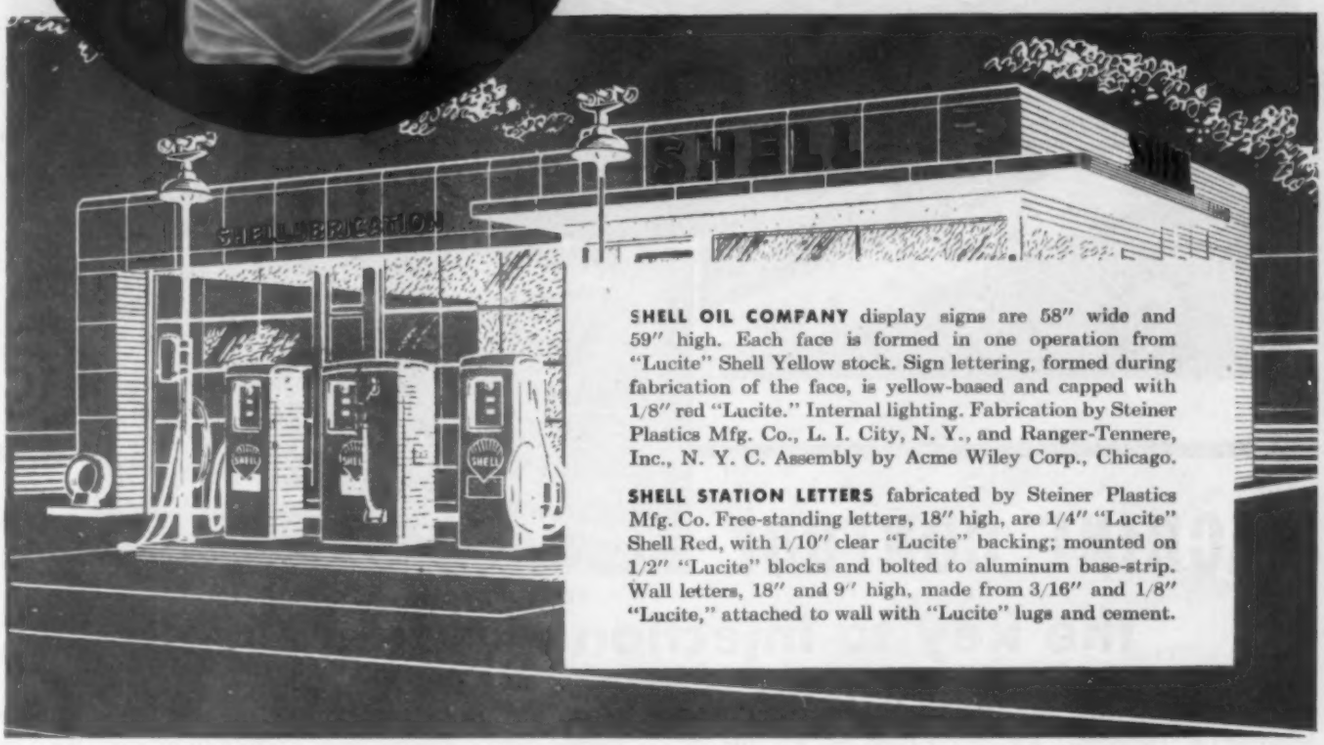
Another example is the manufacturer who produced a ventilating fan with six plastic pieces molded to fine tolerances. Two years ago he put in his own presses because it seemed the best way to assure himself of a dependable supply. He has now reversed himself, has discovered that it is far more practical to purchase his molded parts and eliminate shop headaches — and he is enjoying lower overall costs.

Then there is the toy manufacturer who has his own presses but has found that he can buy many parts more economically from custom molders than he can mold them himself. By taking advantage of the present availability of press time and the superior plastics engineering knowledge of the custom molder, he can spend more time concentrating on sales and distribution.

End users of plastic components would be well advised to move cautiously before installing their own plastics departments, especially now when the matter of cost has become a paramount issue all up and down the line of American industry. The know-how of a custom molding organization cannot be purchased by the hiring of one plant superintendent!

"STOP HERE!"

say these smart new signs of Du Pont "Lucite" designed to build sales and savings for Shell*



SHELL OIL COMPANY display signs are 58" wide and 59" high. Each face is formed in one operation from "Lucite" Shell Yellow stock. Sign lettering, formed during fabrication of the face, is yellow-based and capped with 1/8" red "Lucite." Internal lighting. Fabrication by Steiner Plastics Mfg. Co., L. I. City, N. Y., and Ranger-Tennere, Inc., N. Y. C. Assembly by Acme Wiley Corp., Chicago.

SHELL STATION LETTERS fabricated by Steiner Plastics Mfg. Co. Free-standing letters, 18" high, are 1/4" "Lucite" Shell Red, with 1/10" clear "Lucite" backing; mounted on 1/2" "Lucite" blocks and bolted to aluminum base-strip. Wall letters, 18" and 9" high, made from 3/16" and 1/8" "Lucite," attached to wall with "Lucite" lugs and cement.

"This is for you!" Shell Oil Company's new signs call to passing motorists.

Shell themselves had the idea for these colorful new seashell signs made of "Lucite" acrylic resin. For some time, they've been studying the smart looks and economy of "Lucite" lettering that now graces Shell station fronts.

These beautiful three-dimensional fluted signs diffuse sunlight—eliminating shadows on the shaded side. At night they are lighted from within. Unlike glass, metal or wood, "Lucite" resists the elements—and does not show it. "Lucite" also stands up against breakage. It's hard to crack—takes the fun out of vandalism. It won't chip, craze or shatter. And it never needs repainting, whether crystal-clear or tinted all the way through with brilliant, weather-fast Du Pont colors. If dirtied, its "new look" can be restored in a jiffy with a sponge or a damp cloth. The Shell people know that their striking new "Lucite" signs and station lettering will save time and expense, and improve station appearance.

Traffic-stopping signs of Du Pont "Lucite" are appearing today in service stations, stores, shops and terminals—almost anywhere goods and services are sold. When you think of planning a new sign or redesigning an old one, consider "Lucite"—*first!* You will find this outstanding plastic really has something to offer. Du Pont plastics representatives will be glad to help you solve specific problems. Write today for data on "Lucite" to E. I. du Pont de Nemours & Co. (Inc.), Plastics Department, Room 365, Arlington, N. J.

* REG. U. S. PAT. OFF.

DU PONT
REG U S PAT OFF
Plastics
BETTER THINGS FOR BETTER LIVING
. . . THROUGH CHEMISTRY

MACHINE CONTROL

the key to Injection Molding Profits!

This rigid plastic box, molded by Tri-State Plastic Molding Co., Henderson, Ky., on the Reed-Prentice 10H-24 Oz. injection machine, provides an excellent example of accurate control of such molding variables as time, temperature and pressure.

1. ***Fixed cycling time*** **guarantees uniform production.**
2. ***Temperature control*** **assures proper plasticizing.**
3. ***Pressure control*** **results in completely filled cavities.**

Although the deep one-piece 18 Oz. box uses but 85% of the available feeding capacity of the machine, an even flow of the material is accomplished to completely fill the approximate 320 square inches of mold area — well over the rated area capacity. The plasticizing takes place without burned spots, blemishes or air pockets, to maintain the high degree of clarity necessary for product sales appeal. The box is produced at a cycle of 45 shots per hour while the cover is molded at a cycle of 60 shots per hour.

Profitable production of attractive plastic products for today's competitive market is characteristic of all Reed-Prentice injection machines because of such outstanding operating features as accurate control and wide range . . . and, there's a model to meet every molding requirement. Write Dept. D for full information on the 4, 8, 10, 12, 16, 24 or 32 Oz. capacity machine.

THE WORLD'S LARGEST MANUFACTURERS OF INJECTION MOLDING MACHINES

NEW YORK 6
75 West Street

CLEVELAND 13
1213 W. 3rd Street

INJECTION
REED-PRENTICE CORP.
WORCESTER MACHINES MASS., U.S.A.

LOS ANGELES 11
2314 Santa Fe Ave.

IT WON'T WITH CELANESE* PLASTICS

Bright colors, lightness and low raw material price aren't enough to make a plastic eligible for toys. Toys need toughness too—the shatterproof toughness you find in Celanese acetate plastics.

Toys made of Celanese plastics are safer against counter damage . . . they guard merchandisers against the losses of markdowns and dissatisfied shoppers . . . they reduce shipping losses and rejects.

Celanese plastics are *safe* for toys because they leave no sharp, jagged, dangerous edges . . . they are odorless, tasteless and non-toxic—vital qualities for all toys, and particularly baby toys that lead a hand-to-mouth existence.

Your Celanese representative will be glad to show you why it is good business to insist on Celanese plastics—for toys.

Celanese Corporation of America, Plastics Division, Dept. 1-E, 180 Madison Avenue, New York 16, N. Y.

Celanese* PLASTICS

*Reg. U. S. Pat. Off.

SANTICIZER 141...the VERSATILE plasticizer

Now available in greater quantity than ever

IMPROVED VINYL PROCESSING
•
LOW-TEMPERATURE FLEXIBILITY
•
FLAME RESISTANCE
•
LIGHT STABILITY
•
LOW VOLATILITY
•
RESISTANCE TO EMBRITTLEMENT
•
LOW TOXICITY

Santicizer 141 is an outstandingly versatile plasticizer for polyvinyl chloride and vinyl copolymers. Its wide compatibility and strong solvent action make possible reductions in processing temperatures—permit broader choice of other compounding materials... Its unusual properties are translated into finer end products for your customers.

New manufacturing facilities have made available greatly increased quantities of Santicizer 141 at prices competitive with other primary vinyl plasticizers... In no other will you find such a combination of desirable qualities.

Further details on Santicizer 141 — and the many other Monsanto plasticizers— are contained in a new 88-page book, "Monsanto Plasticizers." For your free copy, contact any District Sales Office, or write MONSANTO CHEMICAL COMPANY, Desk E, Organic Chemicals Division, 1707 South Second Street, St. Louis 4, Missouri. *Santicizer: Reg. U. S. Pat. Off.*

DISTRICT SALES OFFICES: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Houston, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

MONSANTO
CHEMICALS for PLASTICS

MONSANTO CHEMICAL COMPANY
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1707 South Second Street, St. Louis 4, Missouri

____Please contact me regarding Santicizer 141;
____send me a copy of "Monsanto Plasticizers."

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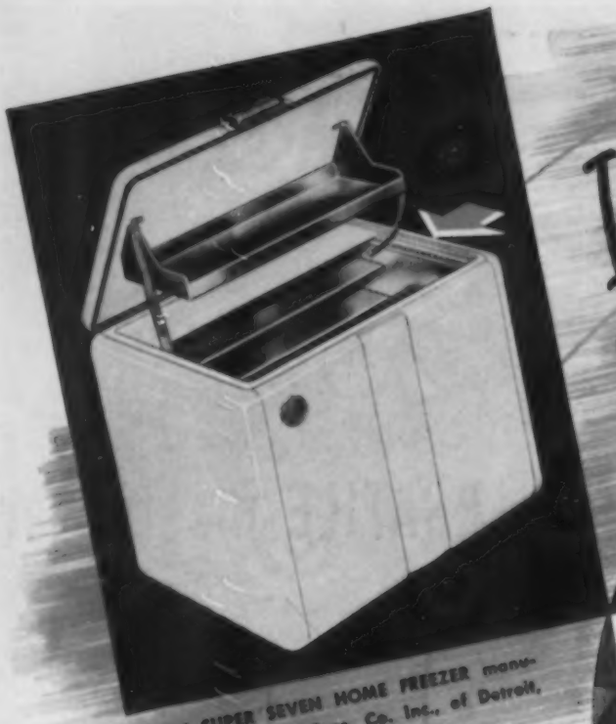
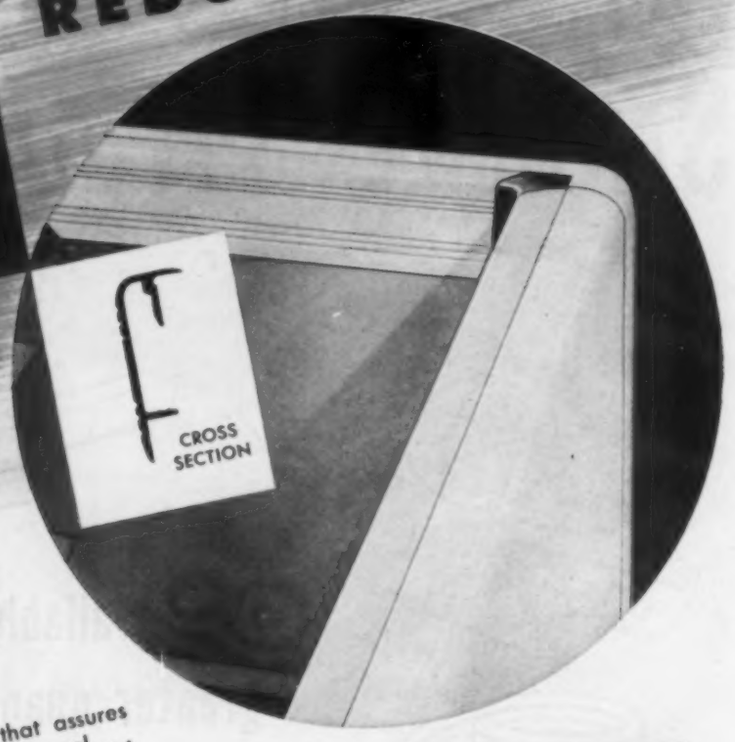
SERVING INDUSTRY...WHICH SERVES MANKIND



ORLEY SUPER SEVEN HOME FREEZER manufactured by Orley Bros. Co. Inc., of Detroit, Michigan.

Improved Product... REDUCED COST



with another MACOID-MADE product!

THE PROBLEM:
To develop a new breaker strip that assures customer satisfaction and adds sales appeal . . . yet effects production economies.

THE SOLUTION:
After MACOID engineers were consulted, they redesigned the breaker strip, utilizing a new material.

THE RESULT:
The new material and design were adopted and solved all problems. CUSTOMER SATISFACTION is assured with a material that is . . . easy to clean, durable, heat resistant, and provides an efficient seal. SALES APPEAL is added with a more streamlined design—a smoother strip, no exposed screws. PRODUCTION ECONOMIES are accomplished because the new breaker strip is easier to apply resulting in reduced labor costs.

When your product needs a "lift", let MACOID help you. If you are designing a new product, or re-designing a present one, MACOID's facilities and highly-skilled technicians will serve you from idea to the finished product.

Originators of Dry Process Plastics Extrusion

DETROIT MACOID CORPORATION

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Electric lanterns . . . bicycle lamps . . . flash lights . . . for which Delta is famous . . . are sporting attractive plastic cases. This company was fed up with "taking it on the chin" because of metal shortages. So with plastic materials plentiful, H-P-M injection machines were installed and like magic . . . new sales appeal was added to the products . . . production hit a new high.

There's no ceiling to savings with H-P-M Injection Machines. They're fast . . . versatile . . . economical. H-P-M's hydraulic clamp saves time on mold set ups. Heavy duty H-P-M pumps, valves and controls assure dependable operation.

Take a tip from Delta . . . switch to H-P-Ms and plastics for greater profits.

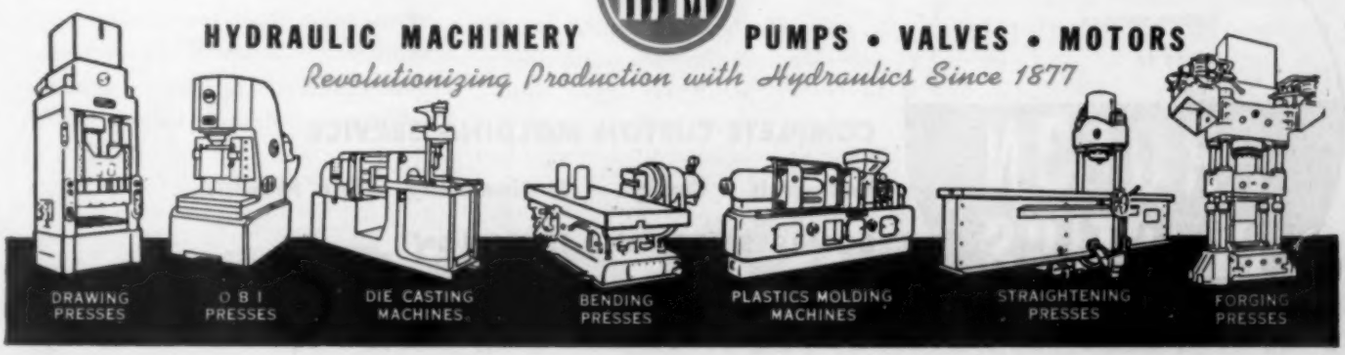
Write for a free copy of Bulletin 4802 describing H-P-M injection molding machines in capacities from 4 to 40 ounces.

THE HYDRAULIC PRESS MANUFACTURING COMPANY
1010 Marion Road **Mount Gilead, Ohio, U. S. A.**

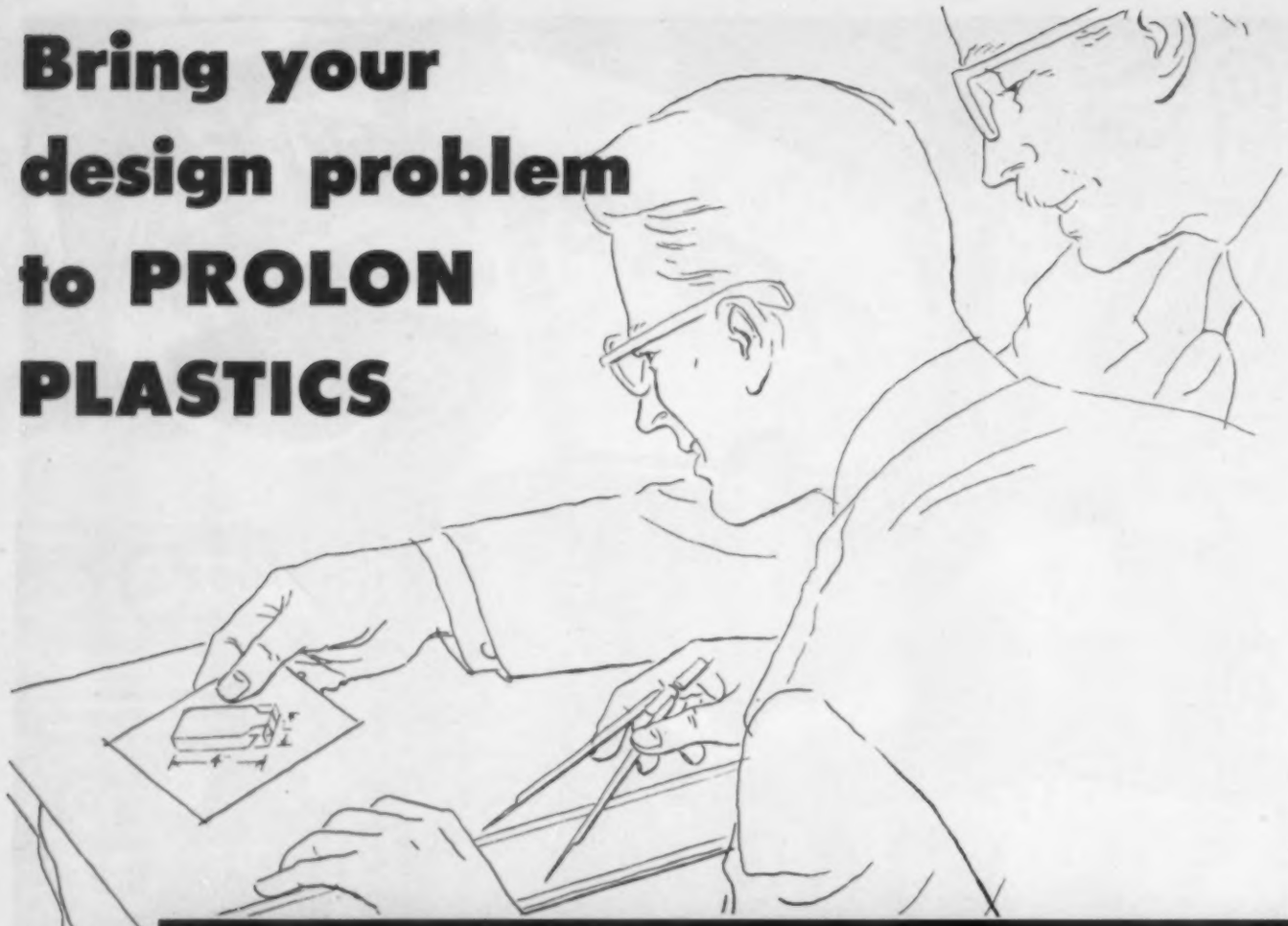
HPM

HYDRAULIC MACHINERY **PUMPS • VALVES • MOTORS**

Revolutionizing Production with Hydraulics Since 1877



Bring your design problem to PROLON PLASTICS



● Assistance in the design of molded parts, in the making of dies, and in the selection of suitable molding materials, are all part of the *complete molding service* available to you at Prolon Plastics. Progressive thinking, backed by more than 100 years' experience, helps you get more for your money.

For better quality, better service, write to

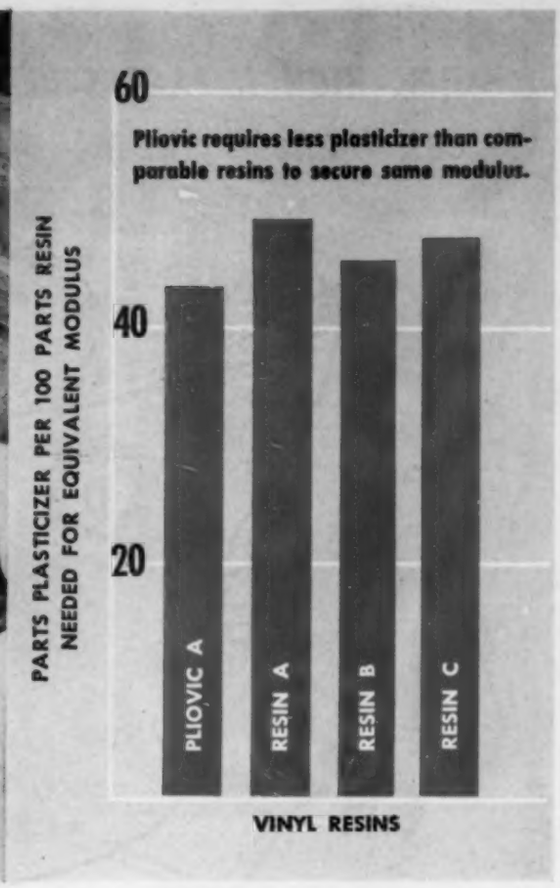
PROLON PLASTICS

COMPLETE CUSTOM MOLDING SERVICE

Research • Design • Engineering • Die Making

COMPRESSION AND INJECTION

A Division of Pro-phy-lac-tic Brush Company, Florence, Mass.



For better Vinyls with less plasticizer

use PLIOVIC A

YOU can reduce your plasticizer requirements—cut your fabricating costs — improve your production—all without changing the present physical properties of your vinyls—when you use **Pliovic**—Goodyear's new and different vinyl chloride-type copolymer.

Pliovic needs from 5% to 10% less costly plasticizer than comparable copolymers. Reason is the more efficient internal plasticizing action of the second monomer contained in **Pliovic.**

Because of this efficient internal plasticization and lower-fusing temperature, **Pliovic** is unusually processable. It can be milled, Banbury mixed, calendered or extruded at lower temperatures than copolymers of comparable molecular weight.

Available in Two Types

Pliovic A may be used alone or in combination with other vinyl resins—has high strength, excellent resistance to flex-fatigue, good age and light stability and good chemical resistance. It has been "use proved" in calendered films and flooring and extruded hose and tubing.

Pliovic AO—for use in organosols—can be compounded to give organosols of high strength, excellent clarity and lower heat-sealing or fusing requirements.

For full details on these laboratory and use-proved **Pliovic** vinyl chloride-type copolymers, write to: Goodyear, Chemical Division, Akron 16, Ohio.

USE PROVED *Products*

We think you'll like "THE GREATEST STORY EVER TOLD"—Every Sunday—ABC Network

GOODYEAR

Pliovic—T.M. The Goodyear Tire & Rubber Company

Gentlemen, your plans call for KYS-ITE!

If you're in the same boat as the engineers we've been listening in on . . . you couldn't make a better choice than KYS-ITE.

Consider KYS-ITE'S permanent beauty that laughs at wear and tear . . . its Herculean impact strength (ranging up to Izod 4.5 ft. lbs. per inch of notch . . . (what a happy solution if you're up against breakage problems!)

And consider, too, the time and trouble-saving advantages of working with an organization that really knows the answer . . . skilled and experienced in the custom molding of heavy duty pieces . . . medium-to-large thermosetting parts. That's Keyes—whose complete service begins with consulting on plans and carries through with prompt delivery of the finished article or component parts. Full information without obligation.

AND THAT'S NOT ALL. In addition to great strength and lustrous finish, other KYS-ITE extras are: light weight, adaptability to odd shape or unusually long pieces, easy-cleaning advantages and good dielectric properties.

CUSTOM-MOLDED IN KYS-ITE

Meeting Your Specifications is Our Specialty

KYS-ITE

KEYES MOLDED PRODUCTS

KEYES FIBRE COMPANY
420 Lexington Ave., New York 17, N. Y.
Plant at Waterville, Maine

Reg. U. S. Pat. Off.

PREFORMED PLASTIC COMBINING LONG-FIBERED PULP AND SYNTHETIC RESIN

Has cooling power of many larger, heavier, more expensive fans

Stands only 10" high; 2½" wide

Weighs less than 3 lb. complete

Easily carried from room to room —or from town to town

Built-in carrying handle

Use it in homes, offices, hotel rooms

Slips into a suitcase

the SALES APPEAL

of the Fresh'nd-Aire FANETTE

came from GENERAL AMERICAN'S Plastics Division

Fresh'nd-Aire Company saw the need for a low-cost, light-weight highly attractive electric fan that could be recognized immediately as a "portable." So, like leading manufacturers in other industries, they turned to General American.

Working with a noted designer, and Fresh'nd-Aire engineers, General American developed the beautiful, sales-appealing Fanette. Molded of a durable, smooth, green plastic, the Fresh'nd-Aire Fanette is an example of General American's skill in developing practical, saleable plastic products for customers.

GENERAL AMERICAN CAN SERVE YOU, TOO!

If your part or product needs the distinctive sales appeal that only plastics can give—come to General American. Expert counsel and tool and die shops are available. Molding can be done on equipment unequaled anywhere—2 oz. to 48 oz. injection presses and compression presses up to 2000 tons with 71" x 74" platen areas.

PLASTICS DIVISION GENERAL AMERICAN TRADE MARK

PLASTICS DIVISION—General American Transportation Corporation
135 South LaSalle Street • Chicago 90, Illinois
New York • 10 East 49th Street
Los Angeles • Richfield Building

Production of new TIMKEN® "OO" bearing being increased to meet demand !

. . . opens the way to new standards of accuracy in high precision applications!

Only a few short months ago, The Timken Roller Bearing Company announced a new bearing—the "Double-Zero"—*twice as accurate* as any Timken® bearing previously produced.

And already the new Timken "Double-Zero" bearing, with a run-out tolerance of only 75 millionths of an inch, is raising standards of accuracy in high-speed lathe spindles, grinding machine work heads, gear cutting machines, small precision rolling mills, and other precision applications. And production of the "Double-Zero" is being increased to meet the growing demand.

The extreme accuracy of the "Double-Zero" bearing results from the use of measuring devices of extreme accuracy, specialized machine tools, and improved manufacturing methods. "Double-Zero" quality is further assured by an extra step in manufacture in which a natural and true geometric contact is generated between all rotating parts. This results in a "Generated Unit Assembly" and assures positive roll alignment, long lasting precision, permanent adjustment, and smoother operation.

The new "Double-Zero" bearing is the latest example of Timken leadership in serving the bearing needs of all industry—another reason why it pays to look for the trade-mark "Timken" on every tapered roller bearing you use. For further information write The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

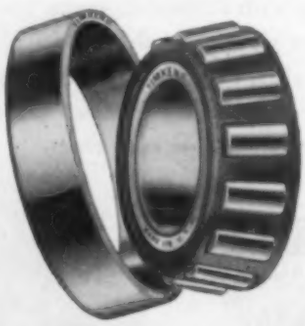
This symbol on a product means its bearings are the best.

A PRECISION TIMKEN BEARING FOR EVERY REQUIREMENT			
CLASS	**"00" (DOUBLE-ZERO)**	**"0" (ZERO)**	**"3" (THREE)**
RUN-OUT	.000075"	.000150"	.000300"
TYPES AVAILABLE	Standard Single Row	Standard Single Row	All types
SIZE RANGE	Up to 10" O.D.	Up to 12" O.D.	Up to 12" O.D.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS



NOT JUST A BALL ○ NOT JUST A ROLLER ▭ THE TIMKEN TAPERED ROLLER ▭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →✳←

How Marvinol® Vinyl Resin improves these products... speeds up their production

MARVINOL VINYL RESINS have proved their advantages under severest testing conditions. To products such as these, they give extra toughness and dryness, superior dimensional stability, greater flexibility at low temperatures. In rigid, semi-rigid and elastomeric formulations, Marvinol VR-10 is paying manufacturers by increasing product quality and speeding up processing.

Marvinol processes faster because it offers you shorter pre-mix, open mill and Banbury cycles...faster extrusion cycles. Marvinol is extruded to make tough, chemical and abrasion resistant continuous cross-sectional shapes... calendered into sheets and free films where its tear resistance, flexibility and dryness pay big dividends...adaptable to rapid cooling methods in injection molding...dispersed to make excellent film, coatings and slush molded pieces.

Test this remarkable vinyl polymer. Send for details about Marvinol. While The Glenn L. Martin Company does not compound or fabricate in the plastics field, we do sell raw materials to processors and will be glad to refer you to one of our customers if you're interested in Marvinol. Write today to Chemicals Division, Dept. M-5, THE GLENN L. MARTIN COMPANY, BALTIMORE 3, MARYLAND.

MANUFACTURERS OF: Dependable Martin 2-0-2 airliners • Advanced military aircraft • Revolutionary rockets and missiles • Electronic fire control systems • Versatile Marvinol resins (Martin Chemicals Division)
DEVELOPERS OF: Mareng fuel tanks (licensed to U.S. Rubber Co.) • Stratovision aerial re-broadcasting (in conjunction with Westinghouse Electric Corp.) • Honeycomb construction material (licensed to U.S. Plywood Corp.) • New type hydraulic automotive and aircraft brake • Permanent fabric flameproofing.
LEADERS IN RESEARCH to guard the peace, build better living in far-reaching fields.

Martin®

RESINS, PLASTICIZERS AND STABILIZERS PRODUCED BY THE CHEMICALS DIVISION OF

Marvinol

THE GLENN L. MARTIN COMPANY • AN INTERNATIONAL INSTITUTION

"BETTER PRODUCTS, GREATER PROGRESS, ARE MADE BY MARTIN"

Makings of a Plastics Fan

It keeps happening! Meet Robbins & Myers, the newest Kurz-Kasch fans—enthusiastic, appropriately enough, because of what plastics have done for their great floor fan, the "Breeze-All."

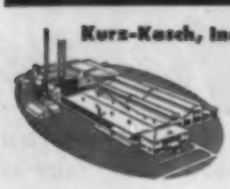
The "Breeze-All" is unique in appearance and performance. Handsome, rich-looking and quietly powerful, it continuously delivers cool, floor-level air throughout large rooms. And its success story is matched by the success story of its plastic parts.

There are two, as pictured, both of them good-sized—the lustrous, rich top cover, 15½" in diameter, and the baffle cone, 6½" in depth of draw. Together, they double as motor housing and table top, and are easily assembled as structural members for a unit capable of supporting a 750 lb. weight. They're attractive, sufficiently strong, and considerably less expensive than either stampings, die-castings or spinnings.

Along with R&M, you'll find many other leading manufacturers—in greatly diversified fields—listed among Kurz-Kasch customers. They seem to like the Kurz-Kasch way of handling production, meeting inspections, fulfilling shipping schedules. We've been doing it for decades—have complete facilities for any compression, transfer or plunger-moulding job. We can handle yours right now.

Kurz-Kasch

FOR OVER 33 YEARS PLANNERS AND MOULDERS IN PLASTICS



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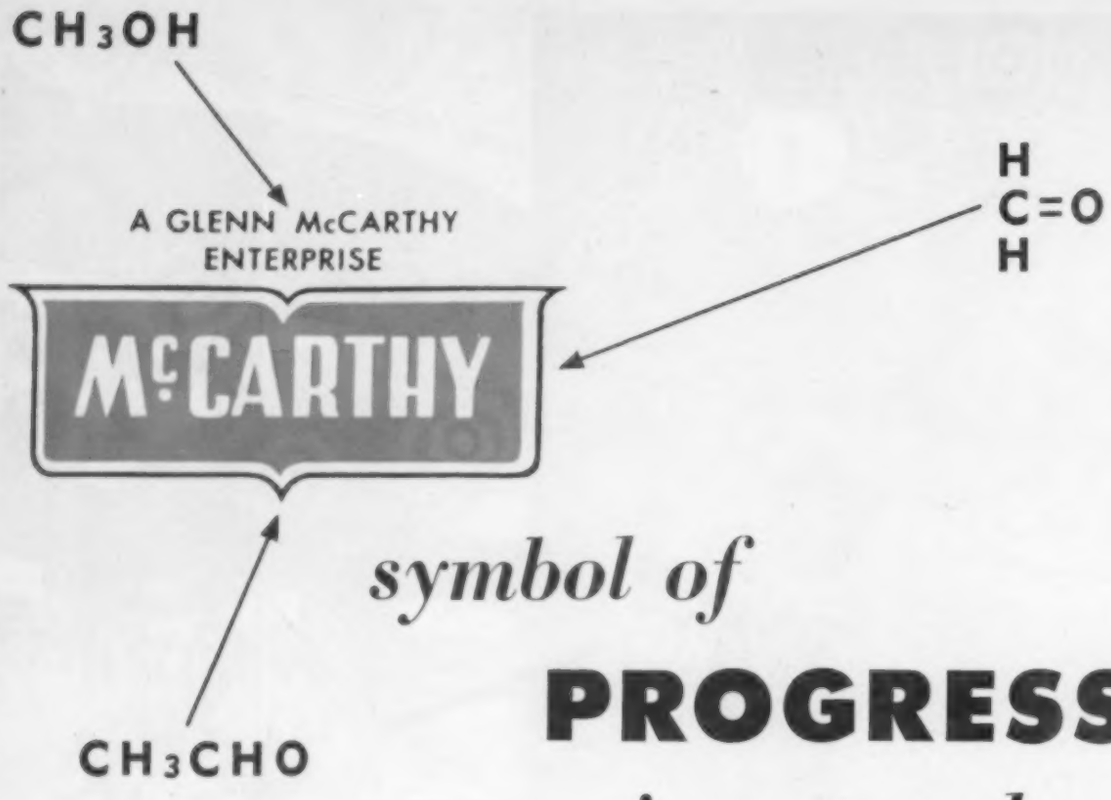
BRANCH SALES OFFICE: New York, *Lexington 2-6677* Chicago, *Harrison 5473* • Detroit, *Woodward 2-5214* Philadelphia, *Granite 2-7484* • Dallas, *Lakeside 1022* Los Angeles, *Prospect 7503* • St. Louis, *Rosedale 3542* Toronto, Canada, *Adelaide 1377.*

EXPORT OFFICES: 89 Broad Street, New York City, *Bowling Green 9-7751.*



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PROGRESS

in petro-chemicals

Progressive research by the engineers and chemists of the McCarthy Chemical Company is opening New Horizons in Hydrocarbons—producing primary and intermediate chemicals through more economical, more efficient processes that mean more abundant, uninterrupted supplies for the Chemical Industries.

One of the most recent results of this **progressive** research in the petro-chemical field is the production of oxygenated hydrocarbons, now achieved through the extraction of oxygen from the air on a tonnage basis in the newly-completed McCarthy Chemical Company plant at Winnie, Texas. This development affords amazing new process economy and efficiency; more importantly, it permits the marketing of chemicals to precision specifications through more accurate production controls.

Thus, the Chemical Industries are served by this investment in **progressive** research—research that also furthers the ends of conservation of our valuable natural resources by converting yesterday's wastes into today's usable raw materials.

NOW AVAILABLE

- 37% INHIBITED FORMALDEHYDE
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- METHANOL
- ACETALDEHYDE
- PROPANE
- BUTANE
- GASOLINE
- KEROSENE
- FUEL OILS

For prompt, sure delivery, McCarthy Chemical Company operates a fleet of 10,000 gallon tank cars, specially lined to guard against contamination, specially insulated against temperature changes. The Company also maintains storage, dock and loading facilities on deep water.

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You'll want this
new catalog on plastics *extrusion*

HERE is up-to-the-minute information and factual data on the latest developments in Plastics Extrusion Equipment . . . the result of 10 years' experience devoted exclusively to the manufacture of machinery for the plastics industry.

Because extrusion represents a practical means for lowering production costs in plastics operations through greater speed, simplicity and versatility, it points the way to increased profits in plastics processing.

You are sure to benefit from the descriptive data contained in this newest NRM Plastics Extrusion Equipment Catalog. Return the coupon for your *free* copy.

NATIONAL RUBBER MACHINERY CO.
AKRON 8, OHIO

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In this vital phase we offer you careful planning from original design to finished product.

We are staffed to engineer your most complicated plastics problem, whether it be a small part or a complete unit.

For plastics . . . think of Bridgeport.

Koppers Polystyrene 8

FOR THE BEST COMBINATION OF ELECTRICAL, THERMAL AND CHEMICAL PROPERTIES

INSTRUMENT CASE

Molded of Koppers Polystyrene because of its excellent electrical properties and low cost. Made by Industrial Devices, Inc., Edgewater, N. J.

PYROMETER CASE

Molded of Koppers Polystyrene 8 to obtain extra heat resistance, add crystal clarity combined with good dimensional stability to assure a close-fitting cover. Molded by Majestic Molding Co., Elyria, Ohio, for Assembly Products Inc., Chagrin Falls, Ohio.

PLATE SEPARATORS

Used to separate the positive and negative plates of "NICAD" Alkaline storage batteries. Extruded Koppers Polystyrene 8 was used for its high resistance to chemical deterioration, extra heat resistance, plus its high electrical insulating properties. Supplied by R. E. Hartung Co., Inc., New York City for Nickel-Cadmium Battery Co., Easthampton, Mass.

● Compare these properties of Koppers Polystyrene 8 with those of other rigid plastics and other polystyrenes. You'll find Koppers Polystyrene 8 offers the best combination of properties for many electrical and mechanical applications.

ELECTRICAL PROPERTIES. Koppers Polystyrene 8 is unsurpassed, with the highest dielectric strength and the lowest power factor.

THERMAL PROPERTIES. Koppers Polystyrene 8 is among the highest in heat distortion temperature of all commercially available polystyrenes—minimum 200°F. under the A.S.T.M. Test D 648-45T. Polystyrenes, as a class, have the lowest thermal conductivity of the common plastic molding materials.

CHEMICAL PROPERTIES. Polystyrenes rate first in resistance to water and all concentrations of acids and alkalies.

This combination of properties—excellent electrical characteristics, improved heat resistance and superior chemical properties makes Koppers Polystyrene 8 first choice for numerous electrical applications including television insulators, instruments, meters, battery cases and many parts of appliances.

Add to this an unlimited choice of colors plus a faster molding cycle and low price and you can see why Koppers Polystyrene 8 is rapidly becoming the most widely used plastic molding material.

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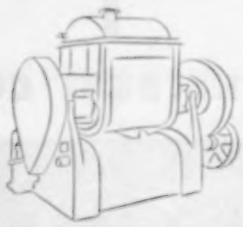
Koppers *Perfected* **Plastics**

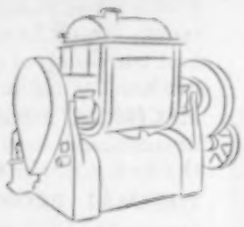
*POLYSTYRENE *ETHYL CELLULOSE *CELLULOSE ACETATE

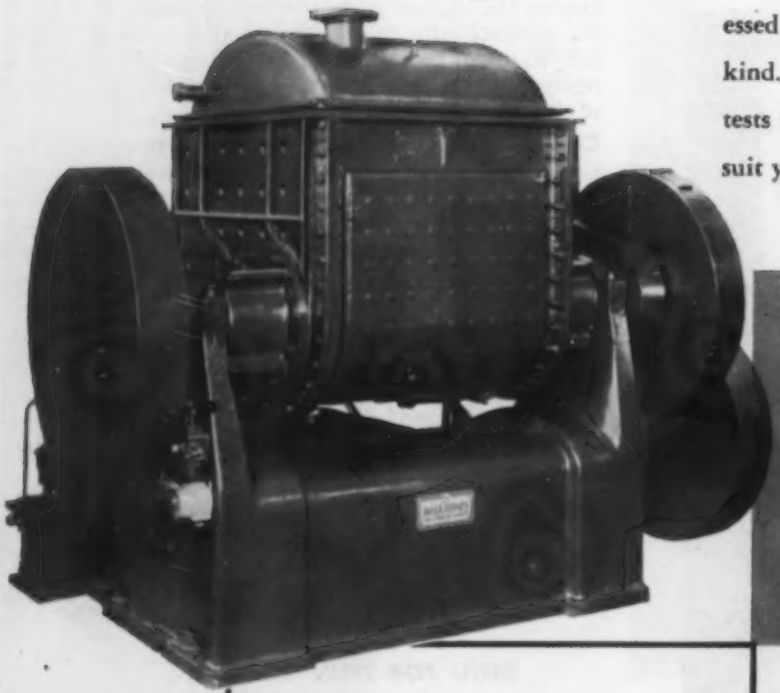
for all plastic masses

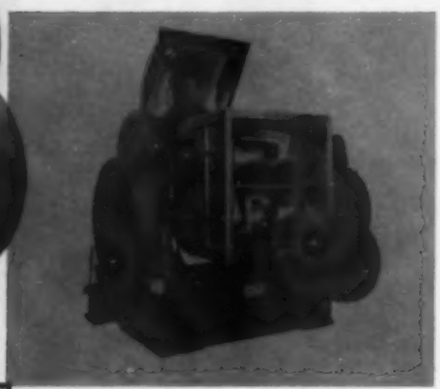
THERE'S A BAKER PERKINS MIXER

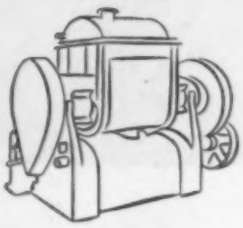


Baker Perkins mixers have been an important part of the plastics industry since its very inception. Baker Perkins engineers, working closely with plastics engineers, have designed plastics mixers that are keeping pace with the rapid development of the industry —meeting its exacting demands with superior equipment. Today, more plastic masses are processed in Baker Perkins mixers than in any other kind. Baker Perkins engineers will run laboratory tests to determine the exact type of mixer to suit your product and production.





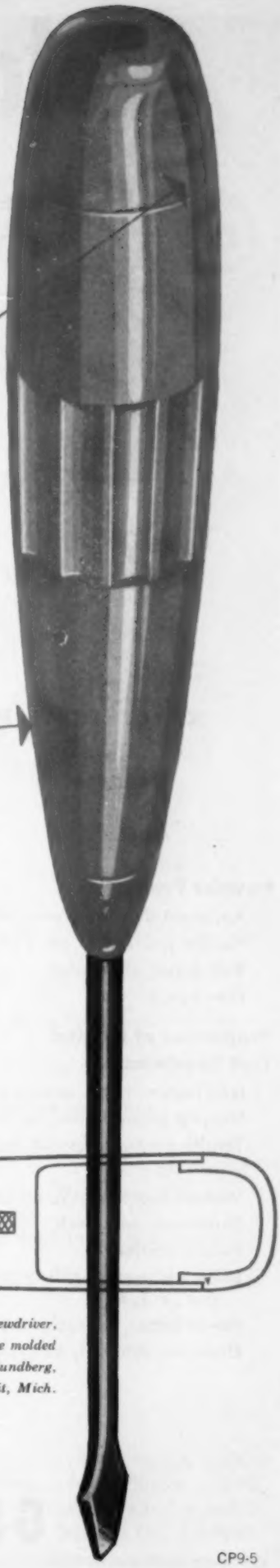




Baker Perkins Inc.
CHEMICAL MACHINERY DIVISION
SAGINAW, MICHIGAN

Illustrated: *A Size 16-JYIM2 B-P Universal Mixer, designed for vacuum operation, having 150 gallon working, and 265 gallons total capacity. Shell is jacketed for 125 psi steam pressure. Working surfaces are stainless steel. Shown in operating and tilt positions.*

- TOUGH AND RESILIENT AT SUB-ZERO TEMPERATURES
- DIMENSIONALLY STABLE UNDER TROPICAL CONDITIONS
- PRECISION ANCHORAGE FOR INSERTS
- SUPERIOR ELECTRICAL PROPERTIES
- EASE OF FABRICATION
- COLORABILITY



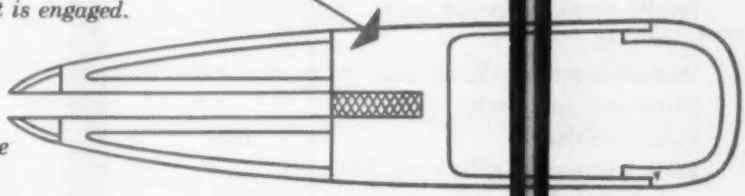
Ethyl Cellulose can Handle it Better

Here's a new twist in screwdrivers—a design that prevents fumbling for that elusive slot in the screw head, and holds the blade securely in the slot once it is engaged.

Only the end sections of the handle are fastened to the metal blade. The center section rides free. This permits the operator to exert continuous pressure against the screw with one hand, while using the other hand to turn.

Designed to be molded with tough ethyl cellulose, this three-piece handle provides firm, precision anchorage of the blade insert, and unrivalled dimensional stability over temperatures ranging from sub-zero to tropical.

Our technical staff invites your inquiries on this and other product improvements.

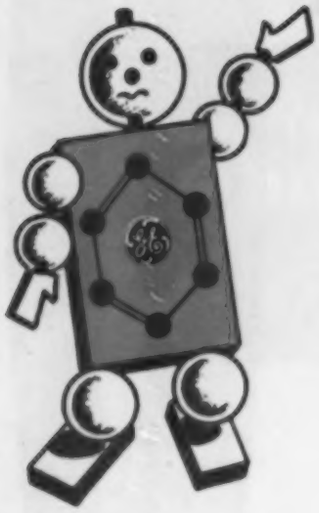


Suggested design for screwdriver, with three-piece molded housing, by Carl Sundberg, Sundberg & Ferar, Detroit, Mich.

HERCULES POWDER COMPANY *916 Market St., Wilmington 99, Del.*

CP9-5

Molders!



G.E.'S NEW FAST-CURING GENERAL-PURPOSE MOLDING COMPOUNDS GIVE YOU

CHECK THESE PROPERTIES

PROPERTY	Average Test Values
Powder Properties	
Apparent density, grams/100cc	50 min.
Powder pourability, sec./100cc	20 max.
Bulk factor of powder	3
Flow range	Medium
Properties of Molded Test Specimens	
Izod impact, ft. lbs. energy to break	0.18
Flexural strength, lbs./sq. inch	10,000 min.
Tensile strength, lbs./sq. inch	7,000
Specific gravity	1.37
Water absorption, % 48 hrs.	1.0
Shrinkage, mils./inch	5.0
Heat distortion, C	145
Dielectric strength, 60 cycles, 25 C, inst., V. P. M.	350
Power factor, 60 cycles-dry	0.30
Dielectric constant, 60 cycles-dry	10.0

1 **Increased production.** Production increases up to 25%, resulting from shorter curing times, have been realized by using these compounds.

2 **Lower cost per part.** Because curing times are reduced compared with present powders, these new compounds give molders lower costs per part.

3 **More parts per pound.** The low specific gravity of these new compounds means more molded parts per pound of material.

4 **The benefits of high-speed automatic molding.** A special granulation makes these compounds exceptionally well suited for high-speed automatic molding operations.

These new General Electric phenolic compounds were developed to meet the need of wiring device manufacturers for a fast-curing molding material for such products as cube taps and outlets. Find out how you may turn out parts of superior finish while increasing production and lowering costs.

WRITE TODAY for data sheets and free samples to Section 38-5, Chemical Department, General Electric Company, Pittsfield, Massachusetts.

You can put your confidence in—

GENERAL ELECTRIC

CD49-53

Capable hands directed by intelligent thinking are a key to manufacturing ability. The skillful, sensitive hands of an inspector are typical of those that guarantee the precision and quality of a product. Equally important are the hands that design . . . that operate the machines . . . that perform the laboring and clerical tasks. And directing all operations must be management that is "in capable hands." An organization with capable hands at work in *every* department can make honest claim to "Precision, Experience, Dependability."

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HARDENED AND PRECISION GROUND PARTS • STANDARD CAP SCREWS • SPECIAL COLD FORGED PARTS
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MOLDS • SPECIAL PRODUCTION TOOLS • R-B INTERCHANGEABLE PUNCHES AND DIES • DIE MAKERS' SUPPLIES

the ROCKFORD HY-JECTOR

8 Coffee pot handles per cycle molded at high speed on 16 oz. ROCKFORD at Imperial Molded Products Corporation. 4812

OF THERMOSETTING MATERIALS IN 1 HIGH SPEED CYCLE

Material is handled *only once.* It is loaded manually into the hopper and the operations of preform tabletting, electronic pre-heating and injection molding follow in automatic sequence. Molders like this clean, closely controlled operation of the ROCKFORD . . . as well as the high hourly production obtained from their molds—far higher than is possible on any other type of thermoset molding equipment. Write for details.

8 oz. and 16 oz. Capacities

COMPLETE *molding* SERVICE

A fully equipped custom molding department has been established to prove the advantages of the ROCKFORD method on a custom molding basis. We offer thermosetting moldings of superior quality at lower prices. Submit a sample or print for our bid. A Rockford engineer is available for consultation on that tough molding problem.

ROCKFORD MACHINE TOOL CO.

ROCKFORD, ILLINOIS

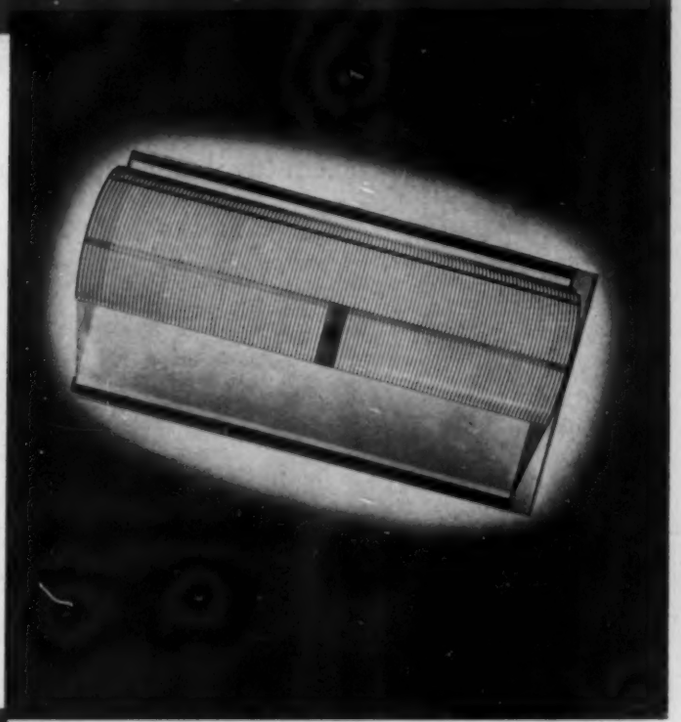
ROCKFORD HY-JECTOR

DESIGNED AND BUILT BY

ROCKFORD MACHINE TOOL CO...
MANUFACTURERS OF *Hy-Draulic*
SHAPERS • PLANERS • SLOTTERS
SHAPER-PLANERS FOR METALWORKING

GERING ENGINEERING MAKES FINE PLASTICS BETTER

Got a Problem?



GERING has the RIGHT PLASTIC for your PRODUCT

In versatile, modern laboratories, Gering daily devises hundreds of specific formulae to meet the growing demands of newly created plastic products. Once formulated, every Gering plastic must pass through a myriad of exacting tests that insure long-range service and dependability.

Whatever your problem, there is a Gering laboratory tested material to make your molding easier . . . to make your product do the job right and look its best! For quality, faster molding cycles, uniformity and service — be sure to check Gering *engineered* plastic materials — all backed by 27 years of accurate plastic know-how. Bring your production and selection headaches to Gering for an immediate and tested solution that will bring big dividends in production!

GET MORE SALES APPEAL with

Color

by GERING

Good products need good colors for that additional boost in sales appeal. Gering specialists take considerable pride in their accurate color matching and reprocessing and coloring of all plastics. Fully toned colors in brilliant contrasting shades are available at Gering for transparent, translucent, and opaque materials. See Gering for that full rich coloring to insure that extra sales appeal.

The WINDO-LIER - ventilator and screen - Polystyrene by GERING

When Sameric Engineering Company was ready to begin production of the Windo-lier, Gering laboratories went to work with this result: ". . . during recent weeks we had the opportunity to run off several thousand pounds of your Polystyrene in various colors on one of the toughest molding jobs we believe to be in existence today . . . each half weighs approximately 15 ounces, having 360 narrow openings which presented a molding problem of rather mean proportions, but thanks to your cooperation and performance of your material, we were able to swing into production in a rather short time . . . your fine material has certainly made our task of molding easier and you and your organization are to be congratulated."—E. GRONEMEYER,

SAMERIC ENGINEERING CO.

GERING PRODUCTS, Inc.

PLASTIC MATERIALS

Erie Resistor
CUSTOM MOLDED PLASTICS

As the pioneer in the field of custom injection molding, Erie Resistor has had a long and wide experience in dealing with the unusual in plastics problems. We have built an enviable reputation for the successful production of designs that other molders considered impossible.

The pieces shown on this page are evidence of our ability to produce Erie Resistor "Three-Dimensional" Plastics of rare beauty; transparent plastics of crystal clarity; flat pieces that are free from warpage; nylon pieces with correctly prefigured shrinkage; mating parts made to exacting tolerances.

The quality of craftsmanship which has made Erie Resistor famous is now available for much larger pieces, whose production is made possible by the installation of a new 28 oz. injection molding press. Write for a copy of our new booklet, "Who We Are . . . What We Do."

Plastics Division

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Experience proves that TITANOX pigments are your best choice for brightening, whitening, and opacifying plastic compounds for sheets, film coated goods, molded or extruded forms. Available in rutile types which are the most efficient for plastics, these titanium dioxide pigments possess excellent physical and chemical stability. Their opacifying power can be utilized to secure any degree of opacity simply through varying the amount used. In addition, TITANOX pigments contribute to improved resistance to sunlight.

Our Technical Service Laboratory staff will be glad to furnish additional data or help you choose the proper grade of TITANOX for your products. Just telephone or write our nearest office. Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; 104 So. Michigan Ave., Chicago 3, Ill.; 2600 So. Eastern Ave., Los Angeles 22, Calif. Branches in all other principal cities.

Photos Courtesy of Bakelite Corporation

7454

® TITANOX

the brightest name in pigments

TITANIUM PIGMENT CORPORATION

Subsidiary of NATIONAL LEAD COMPANY

VISIBILITY... by Swedlow

NEW types of aircraft constantly bring up new and difficult problems in enclosures. The problem of maximum all around visibility for the new Hiller 360 Helicopter was easily solved by SWEDLOW because of

- **15 YEARS OF PIONEERING IN ACRYLICS**
- **RECOGNIZED SPECIALIZATION IN AIRCRAFT**

in the precision engineering and production of astrodomes, canopies and noses.

Perfection in optical properties, regardless of size, has been an important factor in bringing to SWEDLOW the contracts of one after another of the great names in the aircraft industry.

We shall be glad to assign a staff engineer to work with you in solving any problems in plastics connected with new developments in the industry. Communicate with

Swedlow PLASTICS CO.

In addition to Hiller, we are currently supplying production parts to

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DOUGLAS AIRCRAFT CO., INC.

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Manufacturers of

PLYON*

Low pressure laminates using fibreglas, nylon, cotton duck, or combinations thereof, for

FUEL CELL BACKING

used by the foremost aviation concerns in all parts of this country and Canada.

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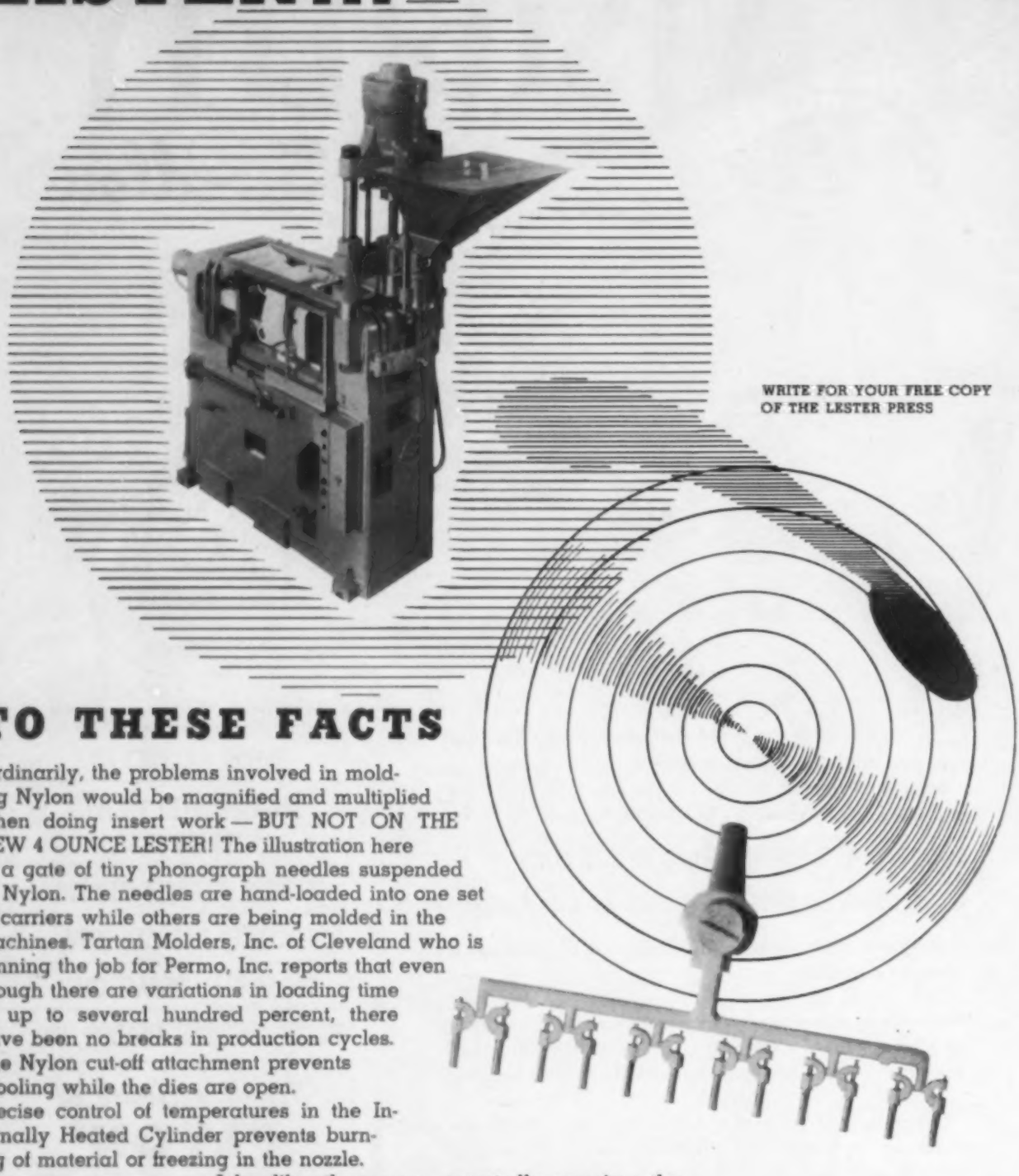

WRITE FOR YOUR FREE COPY
OF THE LESTER PRESS

TO THESE FACTS

Ordinarily, the problems involved in molding Nylon would be magnified and multiplied when doing insert work — BUT NOT ON THE NEW 4 OUNCE LESTER! The illustration here is a gate of tiny phonograph needles suspended in Nylon. The needles are hand-loaded into one set of carriers while others are being molded in the machines. Tartan Molders, Inc. of Cleveland who is running the job for Permo, Inc. reports that even though there are variations in loading time of up to several hundred percent, there have been no breaks in production cycles. The Nylon cut-off attachment prevents drooling while the dies are open. Precise control of temperatures in the Internally Heated Cylinder prevents burning of material or freezing in the nozzle.

Jobs like these are repeatedly proving the amazing speed, efficiency and versatility of the NEW 4 OUNCE LESTER.

LESTER INJECTION MOLDING MACHINES

distributed by LESTER-PHOENIX, INC., 2621 CHURCH AVENUE • CLEVELAND 13, OHIO

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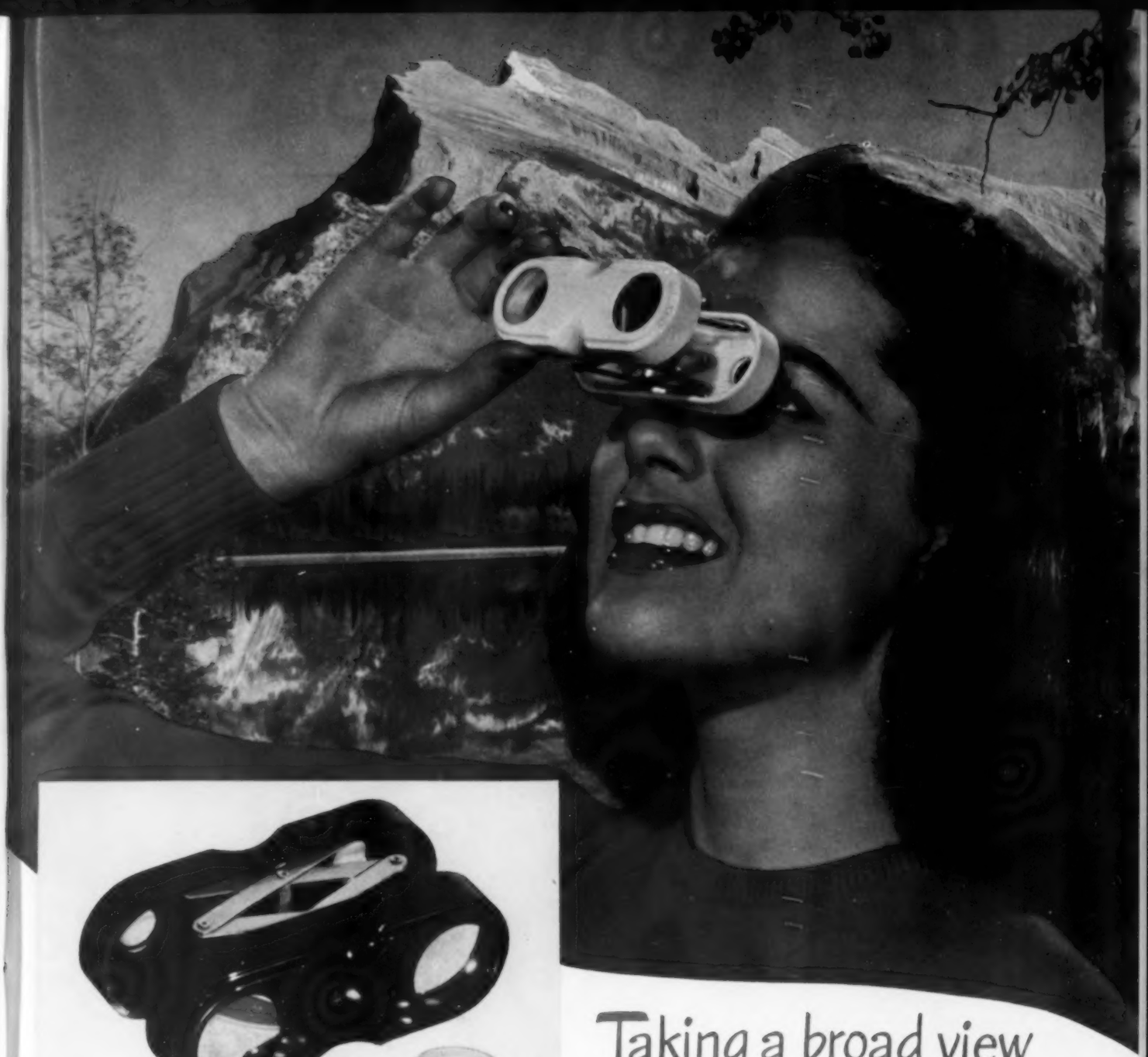

Taking a broad view in Plastics

Porto-Sight Binoculars Molded for Porto-Sight Company, Kansas City, Mo.

Kodachrome of Banff, Alta., courtesy Canadian Pacific Railroad Co.

These Porto-Sight binoculars for which we molded both lenses and housings are a striking illustration of our ability to skillfully create new plastic products. Here was a new idea—planned to fill a long standing demand for lightweight, pocket size binoculars. To create such a product, our engineers and molding technicians had to solve difficult new problems in weight, functional stability and optics.

Thus we succeeded in producing sturdy binoculars weighing less than 2 ounces and with the highest optical power of any within a similar price range.

We have developed a special technique vital to the success of any new plastic product: This technique results in our ability to choose *correct* plastic materials and to mold them skillfully and at low unit production cost.

Our knowledge can help you turn your ideas for new plastic products into profitable reality. Take the first step toward those profits—consult us today. No obligation of course.

Write on your letterhead for the new Injection Molded and Extruded Plastics Catalog. Or, for detailed information about CORLAR PLASTIC* *piping, tubing and fittings, write for circulars containing data and illustrations*

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ELMER E. MILLS CORPORATION

INJECTION MOLDERS and EXTRUDERS of: Tenite, Lumarith, Plastacele, Fibestos, Lucite, Plexiglas, Nylon, Polystyrene, Styron, Lustron, Loalin, Vinylite, Geon, Plexene, Polyethylene, Corex, Forticel, CORLAR PLASTIC*, Saran, and other Thermoplastic Materials

2930 NORTH ASHLAND AVENUE • CHICAGO 13, ILLINOIS

molded plastic base by MPc

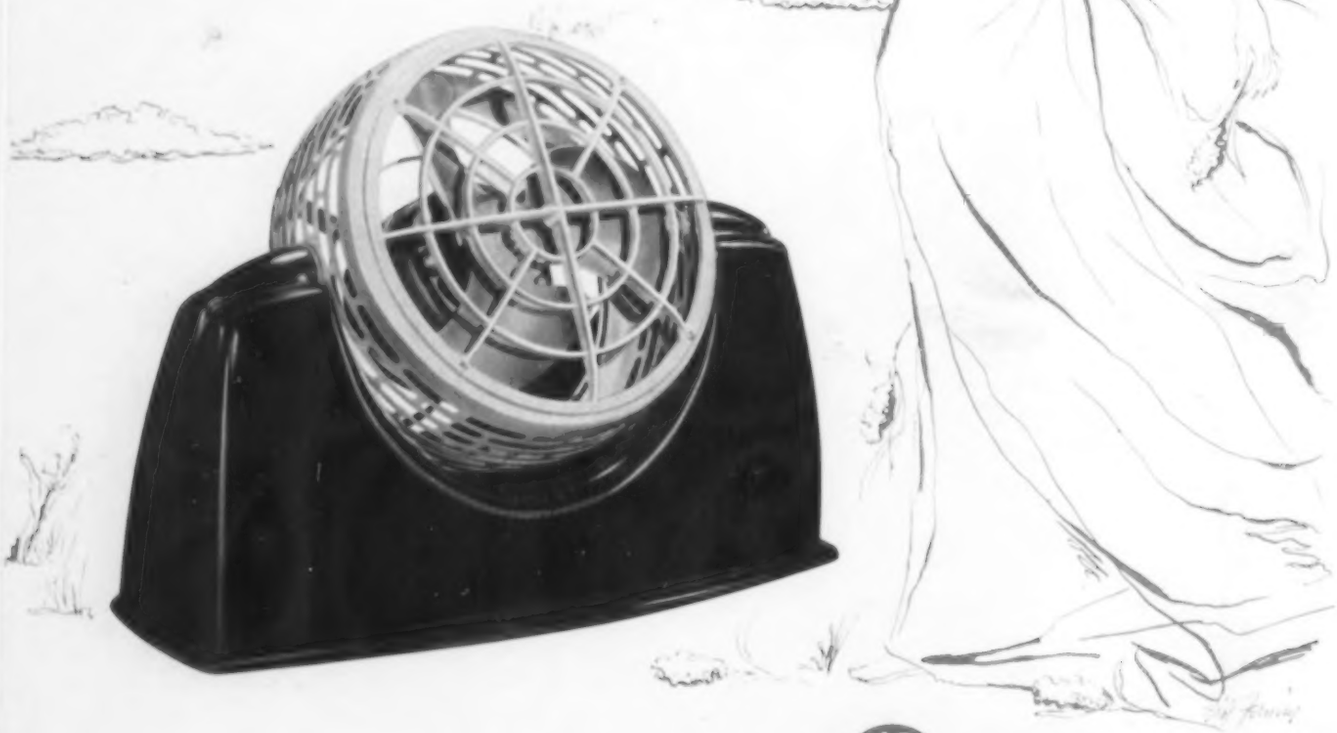
helps make new *FRESH'ND-AIRE**

fresh as a spring breeze

Here's a refreshing innovation in air circulators. Much of its "take-me-home" appeal is due to the smartly designed base, deftly carried out in plastics by **MPc**. The cabinet type base is light in weight, yet amply broad and stable to prevent accidental overturn when the unit is placed on floor, table or window ledge, with the fan housing tilted at any angle from vertical to horizontal. Its smooth-flowing lines and mottled mahogany tone give it the sleek beauty of fine furniture. The plastic base is readily wiped clean with a damp cloth, and resists stains, nicks and scratches.

Ingenious mold design also solves many manufacturing problems. Internal ribbing adds strength and at the same time supports the speed control transformer. Cooling vents and 18 assembly holes are cored in during the molding operation.

This air circulator base again illustrates the skill with which **MPc** translates the designer's concept into practical, economical, manufacturing reality. Submit your plastics product or problem to MOLDED PRODUCTS CORPORATION, 4535 W. Harrison Street, Chicago 24, Illinois.



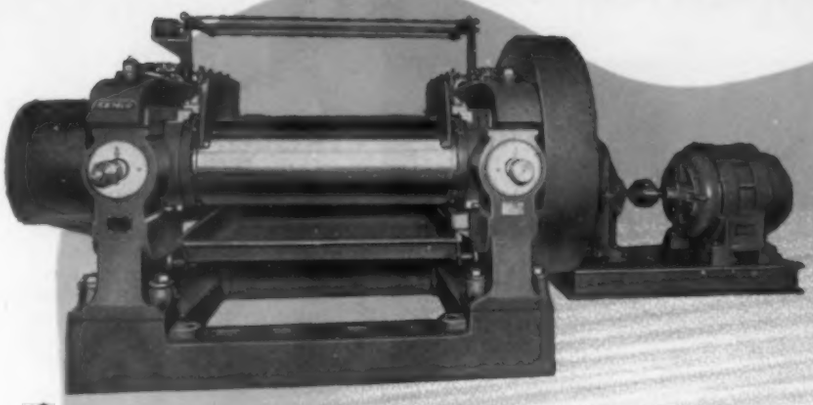
PLASTICS DIVISION

MOLDED MPc PRODUCTS

CORPORATION

* Trade Mark Reg. U.S. Pat. Off. by Fresh'nd-Aire Co., Chicago

MPc molds the base for both models of FRESH'ND-AIRE Circulators: Model 90, 17½" x 13" x 9" and Model 120, 21" x 16½" x 10⅝".

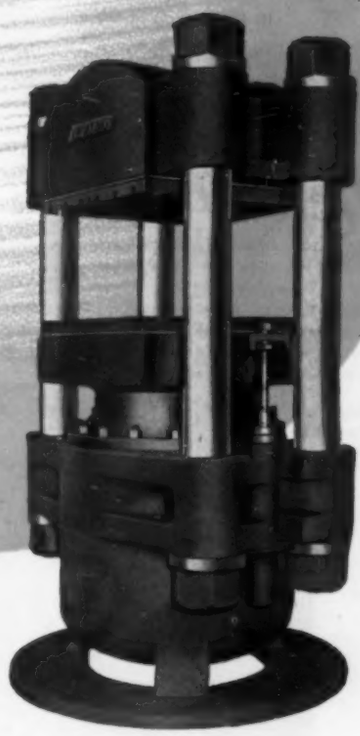


Heavy-duty Mills, in all sizes up to 84 inches, featuring extra heavy construction, smooth operation, and long life.

Laboratory Mills furnished with built-in motor, control and adjustable speed drive. Entirely enclosed ready to operate. Mechanism is readily accessible.

QUICK PROFITS with EEMCO'S QUICKER DELIVERY

42—ton Laboratory Presses, entirely self-contained, equipped with 12"x12" platens, occupying floor space of only 14"x26". Has adjustable opening.



Presses for compression, transfer molding, laminating, and polishing. All sizes and types. Custom built.

TO INCREASE PRODUCTION — and therefore profits — you should choose EEMCO. Here is a line made in a factory with more than 30 years experience in Rubber and Plastic machinery. EEMCO operates its own modern foundry and machine shop, and has every facility including a large stock of motors, controls, and necessary component parts to insure quick delivery. Choose EEMCO for correct design and sturdy dependability. Built for heavy duty and long life, EEMCO saves time and money. Currently, EEMCO is making exceptionally fast deliveries. Write today for quotations.

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This smart breakfast-table setting having appeared as illustrating the "Housewares Award" — winning plastic tableware, in exhibits and publications in the United States, Canada, England, France, Belgium, the Netherlands and Luxembourg is again printed here as visual substantiation of the leadership of Tupper products.

TUPPER!

TUPPER Seals

air and liquid-tight, flexible covers for Tupperware Tumblers, Canisters, Wonder Bowls, Cereal Bowls and many another container of glass, metal and pottery, the contents of which it is desired to keep fresh and wholesome.

Here is where TUPPER Por-Top started.

TUPPER Por-Top

To the thoughtful designing and planning that makes Tupper Seal flexible, air and liquid-tight covers hug the rim of the container to which they are applied in an embrace that makes of that receptacle a virtually hermetically-sealed container, mature consideration and meticulous care developed the graceful non-drip spout that actually prevents dripping down the sides of the container. It takes your product from the refrigerator or pantry shelf right onto the dining table.

To do things better

Leadership imposes many penalties, not least of which is the stern necessity for exercising deliberation . . . mature consideration, in the development of all ideas before presenting them to the consideration of others.

During such periods of deliberation, careful consideration and meticulous planning, it frequently happens that the more impetuous and less conscientious plunge headlong to their own and the buyers very great disillusionment.

As Tupper Por-Top cover is presented, it embodies all the attributes with which leadership is identified and so, it may occupy a position well up in the contemplation of those considering augmenting the "buy appeal" of their own fine products through association with another.

As an initial closure or as an auxiliary cover for use in preserving surplus contents once container has been opened TUPPER Por-Top, specifically engineered to your container may well become just that extra "buy appeal" for stimulating sales volume most satisfactorily.

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Manufacturers of better plastic — CONSUMER, INDUSTRIAL, PACKAGING AND SCIENTIFIC PRODUCTS

FACTORIES: Farnumsville, Mass., and Cuero, Texas **New York Show Rooms 225 Fifth Ave.**

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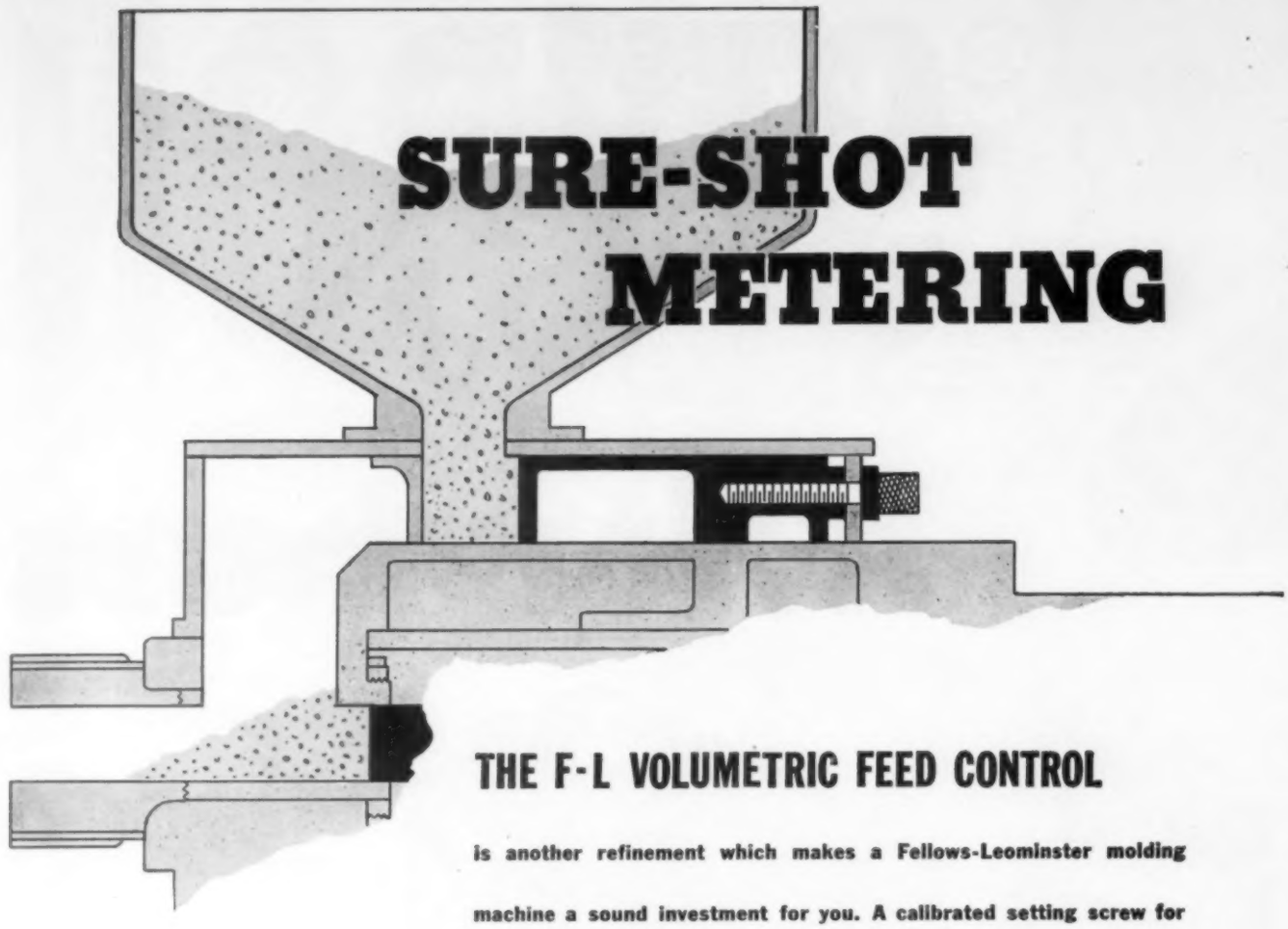
Do not buy Plastic Products just as a substitute for something else. *Do buy them because they do so many jobs so much better.*



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THE F-L VOLUMETRIC FEED CONTROL

is another refinement which makes a Fellows-Leominster molding machine a sound investment for you. A calibrated setting screw for fine adjustment of plastic feed gives a reliable index for subsequent production runs. It's of particular advantage with finely ground materials. Again, Fellows-Leominster hinges the hopper for simple access to the meter slide for quick cleaning in changing materials. It's only one of many design advantages of F-L "Speed-Flo" molding explained in a bulletin available at our nearest office.

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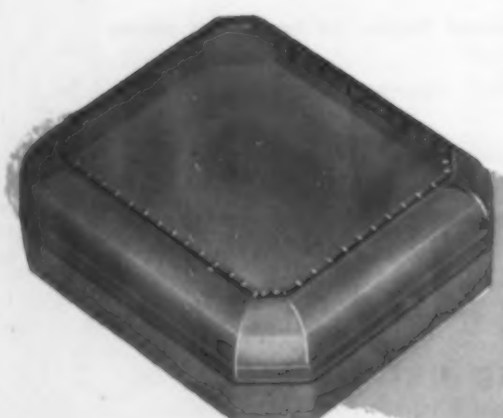
KRISPER BOX, *molded by Tri State Plastic Molding Co., Henderson, Ky. Distributed by Ruzak Industries, Inc., 101 W. 37th St., New York, N. Y.*



JEWEL BOX, *molded and distributed by Commonwealth Plastics Inc., 98 Adams St., Leominster, Mass.*

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More and more products—from housewares, toys and jewelry to radio and refrigerator parts—are taking on new beauty, serviceability and economy when they're molded of Styron. Sparkling clear or brilliantly colorful, Styron imparts the feeling of luxury—at low cost!

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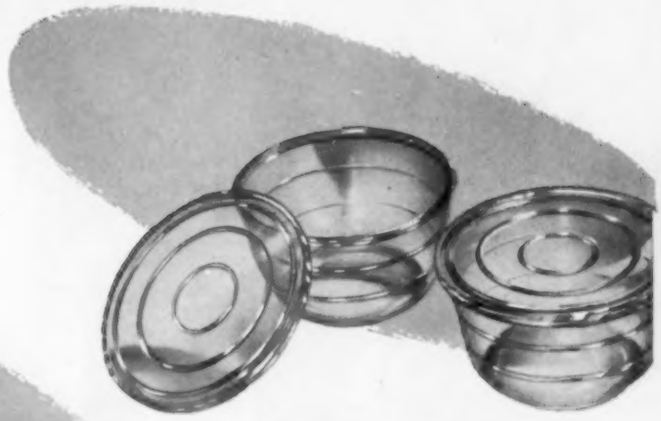
CURTISS CANDY DISPENSER, *molded by Federal Tool Corp., 412 North Leavitt St., Chicago, Ill. Distributed by Curtiss Candy Company, Belmont Ave., Chicago 13, Ill.*

production



BABY STOWAY DISH, *molded and distributed by Southern California Plastic Company, 1805 Flower St., Glendale 1, California.*

"CHIEF" FREIGHT TRAIN, *molded and distributed by Nosco Plastics, Erie, Pa.*

CIGARETTE BOX, *molded by Amos Molded Plastics, Edinburg, Indiana, and distributed by Alden Plastics Company, Fifth Avenue Bldg., New York, N. Y.*

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ORIGINATORS of the Self-tapping Screw, pioneers in new designs, and *specialists* in the manufacture of this type of fastening, Parker-Kalon alone can offer the wealth of invaluable information represented by this "volume". That's why . . .

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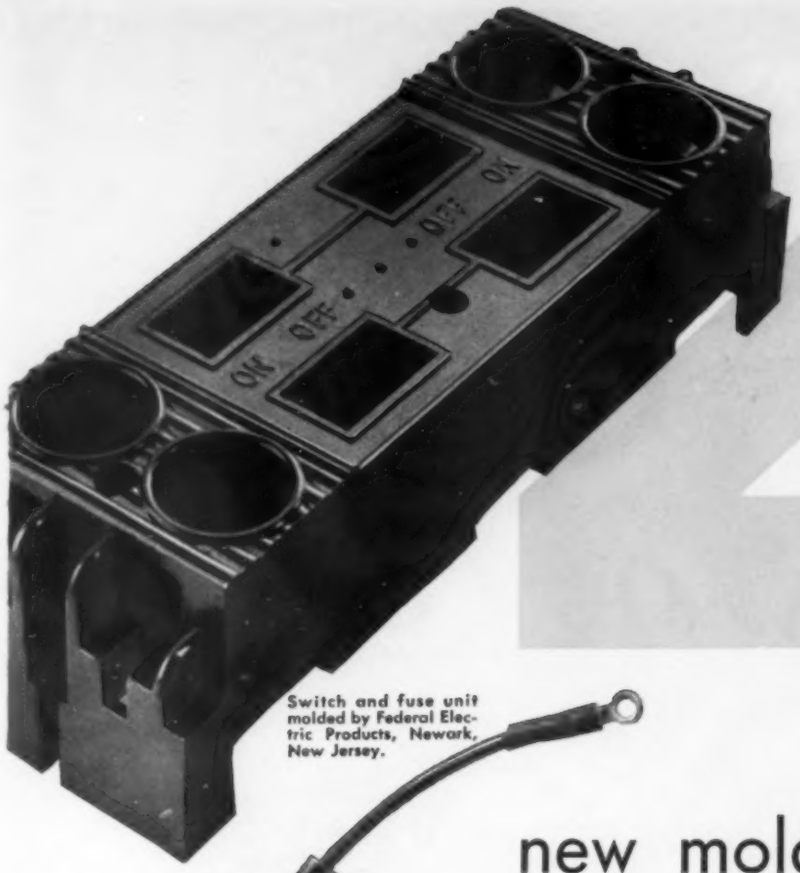

Switch and fuse unit molded by Federal Electric Products, Newark, New Jersey.

New fuse connector for automobile radios molded by Hugh H. Eby, Inc., Philadelphia, Pa.

4 new molding advantages in improved RESINOX

These two molders, using latest Resinox formulations, have gained four additional production advantages:

1. **Shorter cure and thinner cut off**
2. **Improved mold release**
3. **Better flow**
4. **Better appearance**

Today, with manufacturers squeezed between high production costs and growing consumer resistance, *gains like these are vitally important.*

Add to them Resinox's stable price and favorable supply situation and you see why molders who keep up-to-date on materials are doubly prepared to cash in.

See your Monsanto representative right away about improved Resinox formulations . . . or send in the coupon below . . .

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POST-WAR PRESS *Sensation!*

Low-Cost ELMES HYDROLAIRS Now Deliver a Continuous Power Stroke

Here's a *welcome improvement* in small hydraulic presses—continuous power stroke that maintains the pressure you select . . . even on *compressible* materials. And when you add to this the many other Hydrolair advantages—small size; light weight; effortless operation, with your regular shop air line furnishing the power—you've *really* got something good.

NO OTHER PRESS LIKE THIS

Hydrolairs have *neither* pumps nor motors. The amazing new Elmes Power-petuator automatically transforms air-line pressure into *positive* hydraulic force. Packless construction assures freedom from maintenance. *Hundreds already in use.*

EASY TO BUY • EASY TO USE

Hydrolairs are as economical *to buy* as they are to use. The 30-ton bench-type sells for only $865.00; the 30-ton floor-type for $1085.00; and the 50-ton floor-type for $1900.00—f.o.b. Chicago. Hot plates and other accessories, extra. Ask for Bulletin 1036A *today*. Elmes Engineering Division of American Steel Foundries, 230 N. Morgan St., Chicago 7, Illinois.

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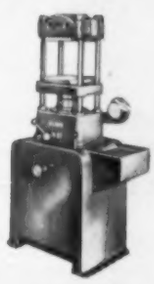
Power-petuator, shown at rear of press, is enclosed in base of floor-types.

30-TON BENCH-TYPE

Opening, 0" to 13". Platen, 10" x 10". Stroke, 6". Dimensions, 30" x 29" x 47" high. Shipping weight, 980 lbs.



30-TON FLOOR-TYPE

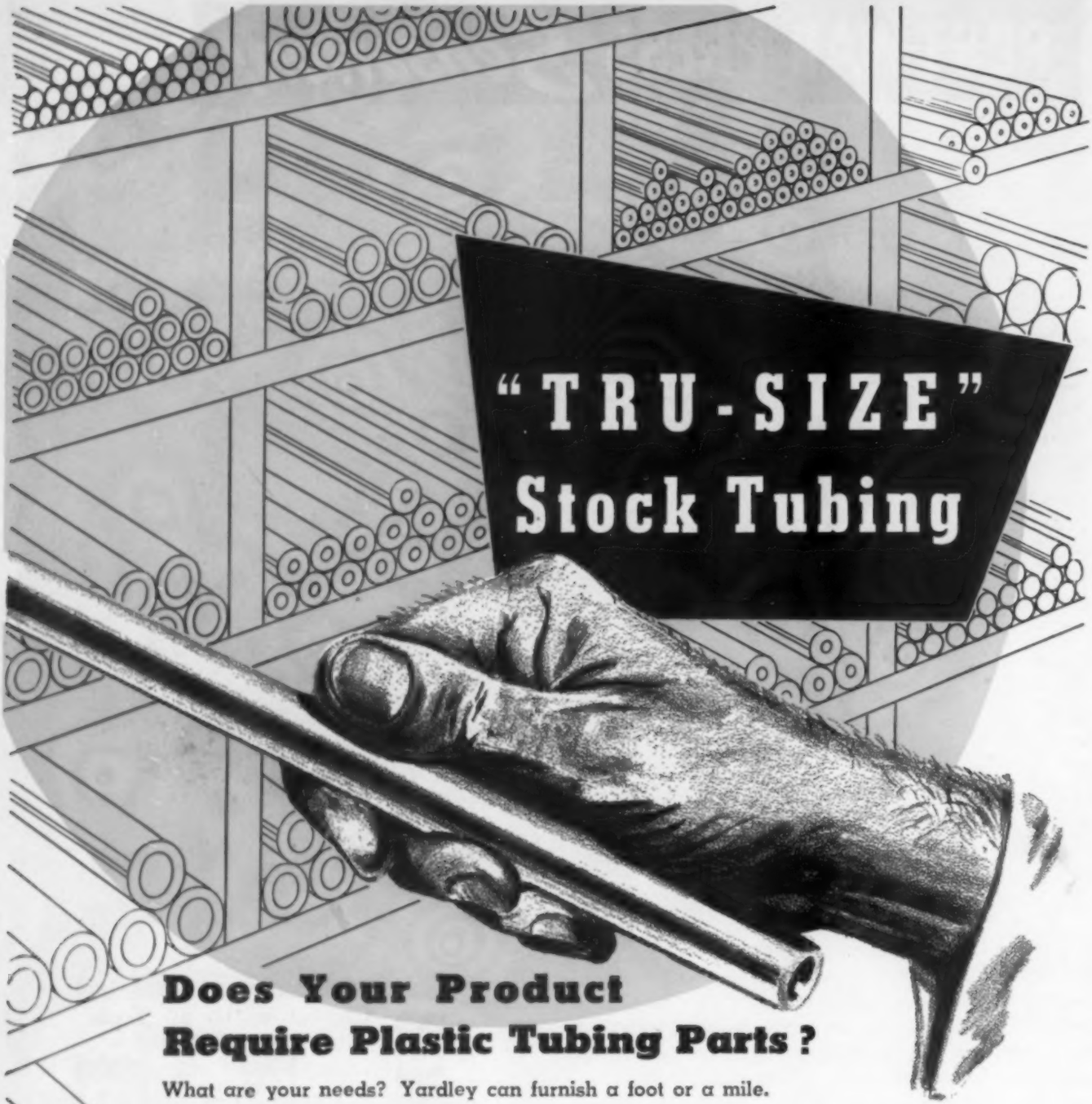
Opening, 0" to 13". Platen, 10" x 10". Stroke, 6". Dimensions, 36½" x 19" x 65" high. Shipping Weight, 1325 lbs.

50-TON FLOOR-TYPE

Opening, 14". Platen 18" x 18". Stroke, 6". Dimens. 40" x 27" x 65". Ship. Wt., 2400 lbs. Push-button control, optional.

ENGINEERED BY ELMES

Good Hydraulic Production Equipment Since 1851



"TRU-SIZE" Stock Tubing

Does Your Product Require Plastic Tubing Parts?

What are your needs? Yardley can furnish a foot or a mile.

We have "Tru-Size" Tubing available from warehouse stock in sizes up to 2" O. D. — clear acetate and butyrate — wall thicknesses of .031", .045" and .062". Also iron pipe sizes of ½", ¾", 1" and 1¼" in clear butyrate only.

We accumulate production over-runs in other materials, colors and sizes. Send for our stock inventory and price list. Yardley may have exactly what you want — or will quote on production runs to your exact specifications.

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By purchasing lower priced uncolored vinyl, polyethylene and Geon* resins and coloring them yourself with UNICOLOR, as uniformly as the manufacturer can, you save three to four cents on every pound of material you extrude. UNICOLOR is not an ordinary concentrate. It's a molecularly blended colorant which gives results far superior to the dry coloring method, *without any mess.* For use, UNICOLOR is merely mixed, 1 part to 24, with uncolored resin and fused under the heat and pressure of the extruder cylinder.

It produces an evenly blended and colored, homogeneous mass which extrudes exactly like uncolored plastic. There's no clogging of screens, no streaking, blistering or bleeding because UNICOLOR is compatible with whichever plastic is involved. Important too, the short mixing time required increases extruder capacity.

When you use the combination of UNICOLOR and uncolored resin, there's no need to wait for resin suppliers to run the color you want. Standard shades of UNICOLOR (including NEMA colors for vinyl, polythylene and Geon* electrical grades) can be delivered immediately; special colors can be matched and compounded quickly. You get the color you want, when you want it.

Send for a test size sample of UNICOLOR. Only by running it in your own extruder can you tell how perfect the results are, how much money you can save.

*Reg. Trademark B. F. Goodrich Chem. Co.

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PLASTICS INC.
326 Waverly Avenue
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CUSTOM COMPOUNDERS OF THERMOPLASTIC MATERIALS

ASK STOKES

When you want BIG preforms... WHEN YOU WANT small PREFORMS...

...there is a Stokes Preform Press which is perfect for the purpose.

Stokes Preform Presses have been developed through the years to meet the growing demands of the plastics industry.

Simple rugged design assures long trouble-free service at high production rates. You can adjust for pressure, density, weight, and thickness while presses are in operation.

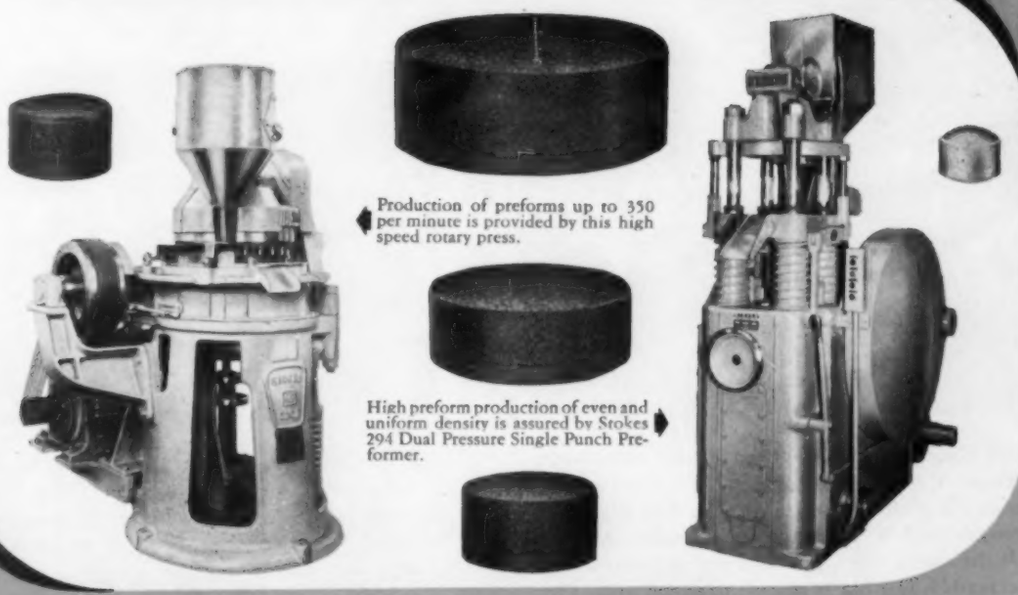
The new Stokes Dual Pressure 294 makes large, heavy preforms up to 4" diameter and 300 grams weight at rates up to 60 per minute. New design produces preforms of uniform density from top to bottom; ideal for preheating and plunger molding. All edges are sharp and firm and free from crumbling. Breakage, damage in handling, and material waste are cut to a minimum.

The DDS-2 Rotary is "the old reliable," with years of profitable history in the experience of plastics molders throughout the world. Ball or other standard shaped preforms at rates up to 350 per minute.

These preform presses, shown below, are just two types from the broad range of powerful and economical Stokes presses for every preform need. And Stokes Advisory service meets *all* requirements for information on plastics molding.

F. J. Stokes Machine Company,
5934 Tabor Rd., Phila. 20, Pa.

Stokes makes Semi-Automatic and Automatic Molding Presses, Plunger Presses, Closure Presses, Preforming Presses, Industrial Tabletting and Powder Metal Presses, Vacuum and Special Processing equipment, Water Stills and Special Machinery.



Production of preforms up to 350 per minute is provided by this high speed rotary press.

High preform production of even and uniform density is assured by Stokes 294 Dual Pressure Single Punch Preformer.

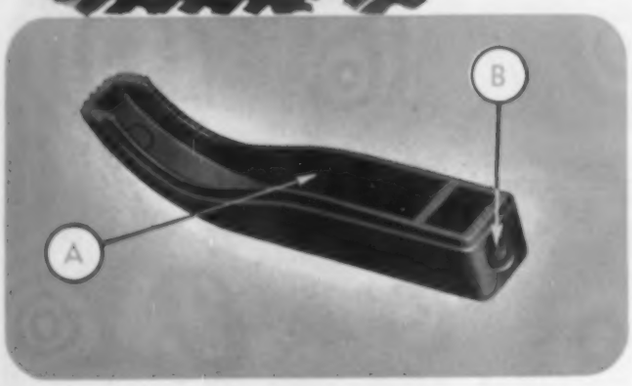
STOKES KNOWS HOW

PLASTIC PARTS FROM Stock Molds PROVIDE ECONOMICAL Styling . . . Quickly

Many times, great economies can be effected . . . costly delays avoided . . . by using a plastic part produced from one of Aico's stock molds.

For example, this 2 cup percolator has the eye appeal, and low cost, popular with buyers largely because of its plastic Aico stock mold handle.

Emson Products Corporation selected this handle because of its smart styling . . . comfortable grip . . . *and the savings in time and costs afforded by the use of a stock mold part.*



Shiny, satiny black phenolic was used for this percolator handle because of its smooth appearance and its resistance to heat. Deep channel construction (A) provides ample strength with a minimum of material. A 3/16" hole (B) is drilled through the butt end to provide for easy, fast assembly. Handle is shaped to fit the grip. The handle is produced in a sixteen cavity, semi-automatic mold in one of our modern high speed presses at the rate of 5,000 pieces a day.

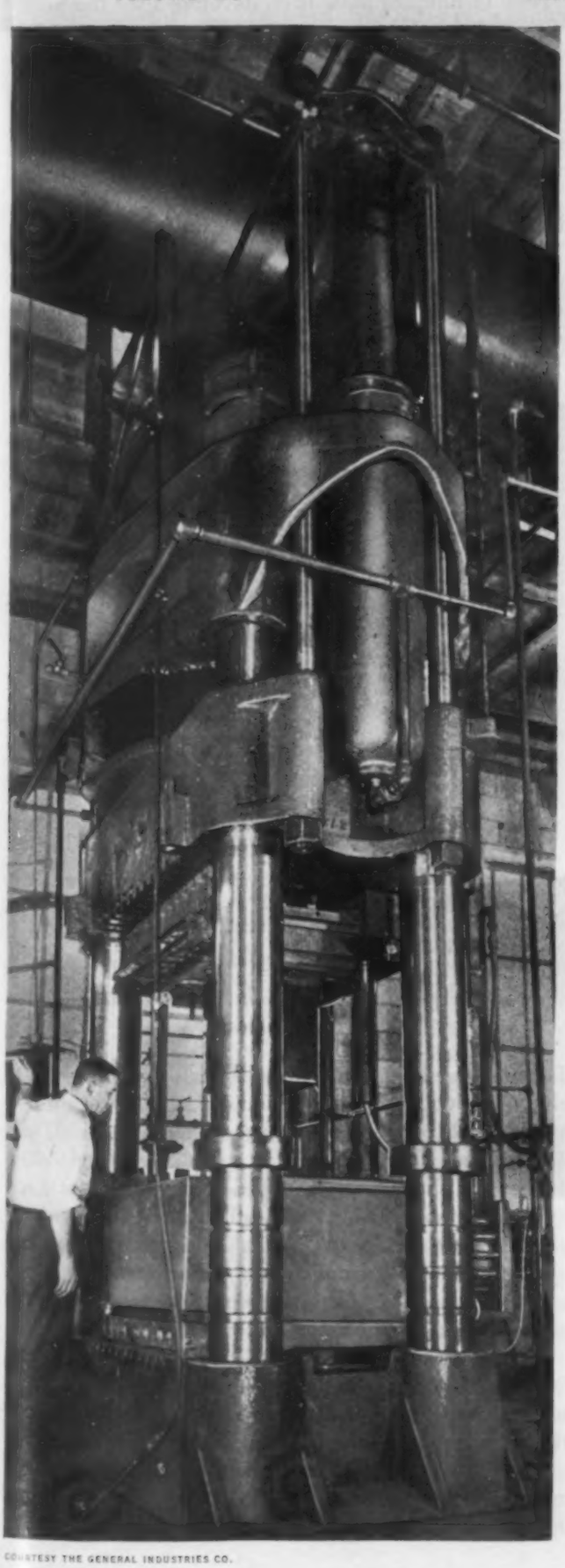
If you need plastic parts in a hurry, let Aico engineers recommend the most suitable for your use from the great assortment of up-to-date Aico stock molds. Write today for your free portfolio of actual Aico Plastics Applications.

AMERICAN INSULATOR CORPORATION
New Freedom, Pa.

AICO PRECISION MOLDING
for over 30 years

MODERN PLASTICS

VOLUME 26 MAY 1949 NUMBER 9



COURTESY THE GENERAL INDUSTRIES CO.

New Markets Demand Larger Pieces

Some compression molders are pioneering lucrative new fields in super-size jobs with new methods, new materials, new equipment — and new ideas!

IN any future history of plastics progress, the present year will surely mark the point at which molders of thermosetting materials, particularly phenolics, cast off the shackles of piece size and weight limitations and moved into tremendous new markets with big moldings.

An article titled "How Big Can Molded Pieces Be?", MODERN PLASTICS, October 1947, page 101, showed progress up to the point of an 11-lb. shot. Today's big pieces start at 11 lb.; not a few of them run well over 20 lb. per shot. It is predicted that in a matter of months 40-lb. shots will be made on a production basis.

For some years a limited number of large piece jobs has been produced, and a few companies have led in specializing on this work. The same companies lead in the present movement toward still larger piece molding.

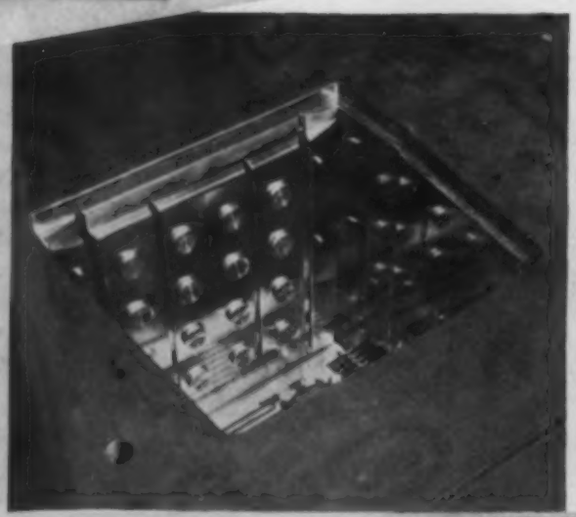
The stymie to the more general production of large pieces in the past was caused by four main factors. First, plain cost economics limited fore-

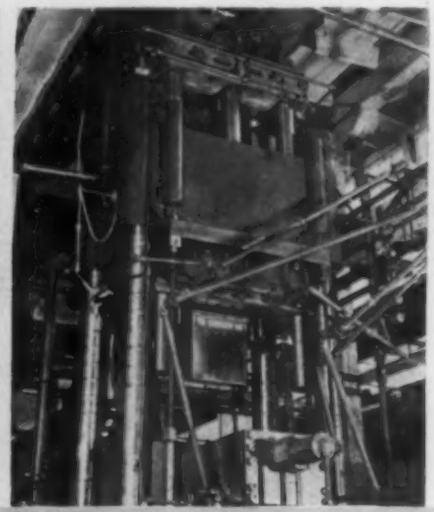
New Hallicrafter television set will be housed in this 17 by 16 by 20 in. cabinet molded in two pieces of 11 lb. each. Phenolic cabinet saves 5 lb. in shipping weight; compared with wood, set retails for $20 less

competitive economic position of plastics in all markets justify the installation of presses and preheat equipment big enough to make huge and heavy pieces in quantity and at high speeds.

New techniques have been developed for the best use of new large presses. Automatic materials handling is almost a "must"; handling of the big molded pieces is a problem now being overcome. New resins will permit lower pressures to be used, extending the piece weight capacities of smaller presses.

The big impetus has come from the television industry. Well over 1,000,000 television sets are in use in this country. The industry has a sales target of at least 12,000,000 sets by the end of 1952, and approximately 60% of these future sets, or 6,600,000, will be "table" models, mostly with plastic cabinets.





COURTESY BAKELITE CORP.

Interior view of a cavity in which 12-lb. Philco television cabinets are molded. Ventilating holes are molded into the cabinets by the 16 round plugs which are seen here in the molding position. Molding press is shown at right

Hydraulic pull-back, lower right, on French Oil Well Machinery compression press operates ventilating-hole molding plugs in television cabinet cavity

seeable markets. Wood and metals were cheap enough and labor for their fabrication was cheap enough to keep large plastics moldings, particularly housings, out of competition. Second, the pressures needed to mold most thermosetting materials were so high that they limited the piece size on "standard" presses of up to 600-ton capacity. Third, high frequency preheating oscillators were so small as to limit the preform weight that could be used in a single shot with a minimum of material handling. Fourth, the historic markets for plastics—especially phenolics—in electrical parts, communication devices, radios, home appliances, and industrial applications, were good enough and profitable enough to discourage wider development of equipment, techniques, and materials for larger pieces.

Now all that has changed. New markets and the

Today, 14 molds for phenolic television cabinets are either producing or being built. The smallest of these molds a 12-lb. piece; the largest of these molds a 22-lb. piece.

These cabinets are being made, not because the television makers have an aesthetic preference for plastics, but because plastics cabinets are more uniform, have better finishes, are more durable, are easier to handle on the assembly line, and are actually less costly than wood or metal cabinets.

Take the case of Philco Corp., now producing thousands of television sets a week with an output schedule of 400,000 receivers in 1949, or double the 1947 production of the entire industry. Philco owns its own timber lands, saw mills, and factories for making wood cabinets. Yet Philco is now receiving delivery of 12-lb. cabinets for 7-in. tube sets from

American Insulator Co., New Freedom, Pa., and The General Industries Co.

Why plastic television cabinets?

The reasons? First, a wood consolette-type cabinet requires 525 different construction operations before it is ready to accept the chassis; a plastic cabinet will require only from three to six operations to arrive at the same point. Second, when a model is released, production must be rapid to satisfy demand and forestall competition; once the molds are run in and the cycles established, cabinet production in plastics is faster than in any other material. Third, the life of a plastic cabinet is longer than that of wood and the permanence of its finish is superior. Fourth, including the amortization of mold cost for a typical cabinet over 15,000 sets, Philco has proved phenolic to be approximately 15% cheaper than wood.

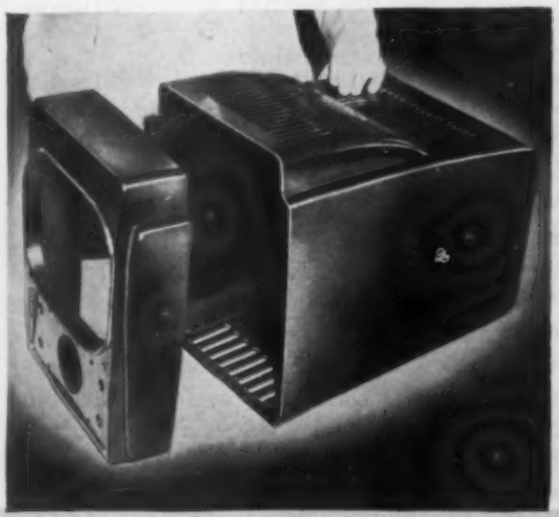
Philco is also having molded by General American Transportation Corp., Chicago, Ill., a combination radio and phonograph cabinet, the body of which weighs 13 lb. and the lid 3½ pounds. The unit is produced at a rate of 12 cabinets per hour.

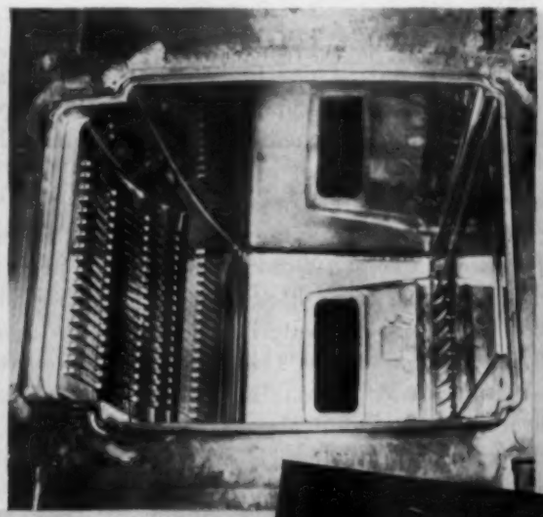
The Hallicrafters Co., Chicago, is placing on the market a new television set with a 64 sq. in. picture in a cabinet 17 in. wide, 16 in. high, and 20 in. deep. The model is available with either a wood or a plastic cabinet, the wood-housed unit having a shipping weight of 85 lb. as compared with 80 lb. for the plastic-housed job, and the wooden unit retails at $20 more per set. The Hallicrafter cabinet is molded by General American Transportation Corp. in two parts, each weighing 11 pounds.

Being molded by the Plastics Div., Chemical Dept. of General Electric Co., Pittsfield, Mass., and by General American Transportation Corp., is a new GE phenolic television cabinet. This job is molded in two parts: the case, 14¾ in. high, 11½ in. wide, and 17 in. deep, with an average wall thickness of 3/16 in., weighs 7 lb. 14 oz.; the front with the same height and width dimensions but a depth of 3⅜ in., weighs 3 lb., 2 ounces. The set, when sold in wood, retails at $279.95; in plastic at $239.

From the above examples and from the article on Admiral's new cabinet, molded by Molded Products Corp., Chicago, Ill. and discussed in MODERN PLASTICS, February 1949, page 74, the imposing picture of the possibilities for large compression moldings in the television field becomes apparent.

(*Please turn to page* 58)

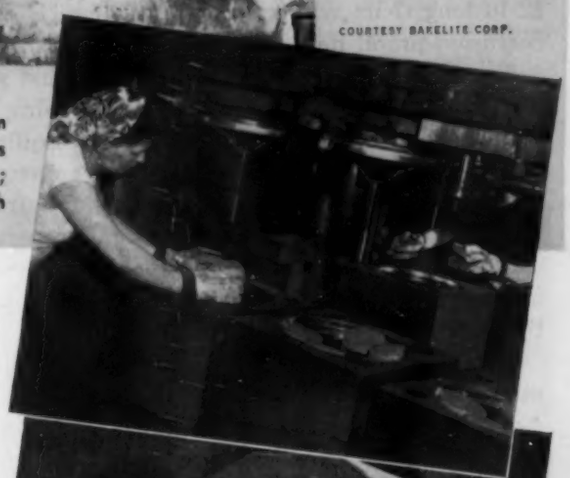




COURTESY PLASTICS DIV., GENERAL ELECTRIC CO.

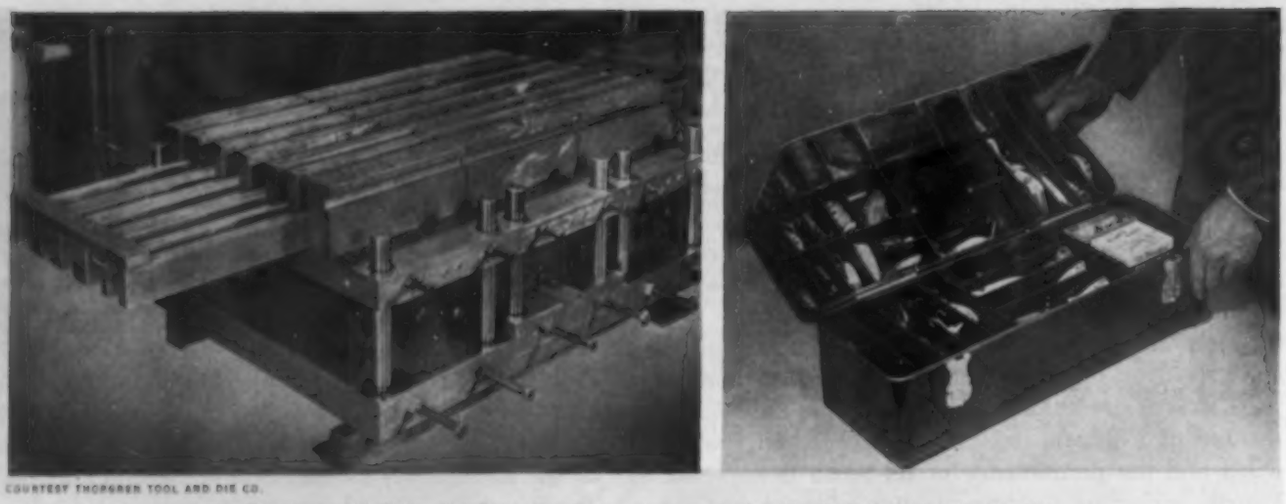
Front and case of new GE phenolic television cabinet. Complete set sells for $41 less when housed in plastic cabinet than when furnished in wood

Cavity in which the GE television cabinet case is molded. Case is approximately 15 by 12 by 17 in.; average wall thickness is 3/16 inch



Below: Molding phenolic washing machine gyrators in a six-cavity mold at a rate of 68 to 70 per hour. Upper photo shows operator placing the preforms in the cavities; in lower picture she is removing the molded parts

COURTESY BAKELITE CORP.



COURTESY THOMSEN TOOL AND DIE CO.

Combination mold (left, above) for producing three-part phenolic fishing-tackle box (right, above), cost over $20,000. Complex engineering problems are involved in big jobs such as this

But television is only the start. Once the equipment, materials, and methods for this type of operation have been established and the preheating, molding and handling problems overcome, other large markets loom. General American Transportation Corp. is knocking out 68 to 70 Maytag washing machine gyrators per hour, using a 6-cavity mold; each gyrator, molded of red Bakelite phenolic, weighs 2 lb., 4 ounces. The same company is producing, at a rate of 10 shots per hour, an 11-lb. tackle box for Crossman-Brinkman Mfg. Co., Inc., Hammond, Ind. This three-piece Bakelite phenolic box, 22 in long, 7 in. wide, and 7½ in. high, is durable, corrosion-proof, damp-proof, and will float.

Another General American job, new last year, is the Toledo Guardian Duplex scale housing which won the award in "Store and Business Equipment" classification of the Seventh MODERN PLASTICS Competition. This housing, made of Plaskon urea, has three parts which replace seven smaller parts used in a previous design, and is probably a fore-runner of many simplification jobs to be made possible through large piece molding.

For Thonet Bros., Inc., New York City, furniture manufacturers, American Insulator Co. is molding a stool seat in light shades of urea and in black phenolic, to be used with formed laminated wood legs. For the same company, Plastic Engineering Co., Sheboygan, Wis., is molding, in both phenolic and urea, seats and backs for an all-purpose outdoor-indoor chair with the same type of leg construction. The pieces are not particularly heavy but their area and design classifies them as large moldings, particularly the chair components. Like Philco, Thonet is in the wood business. Yet the company has found that its plastic chair can be produced at practically the same price as an all-wood unit but with great advantages in durability and cleanability; the chair is also easier to merchandise by virtue of its built-in color and finish. Thonet is so delighted with its plastics operations that designs are now being developed for other plastics items in its furniture line.

Expanding fields

Examples are numerous of industrial molding of large pieces by compression and transfer. To those mentioned in our 1947 article on the subject have been added textile machinery parts, electrical parts, industrial truck wheels, and many others, all larger than any previously considered and some running over 20 lb. per shot. One good example is a high impact asbestos-filled phenolic circuit breaker base 9 in. wide by 22 in. high, molded for I-T-E Circuit Breaker Co., Philadelphia, Pa., by Michigan Molded Plastics, Inc., Dexter, Mich. Another is a 12½-lb. valve seat, 10¾ in. in diameter and 3 in. thick,

Large Philco phono-radio housing has been removed from mold in background, will be placed on shrink fixture in foreground

COURTESY BAKELITE CORP.

molded by Chicago Molded Products Corp., Chicago, Ill., for the Halliburton Oil Well Cementing Co., Duncan, Okla.

From abroad have come further examples of large compression molding developments. A. C. I. Plastics Pty. Ltd., Spotswood, Victoria, Australia, is molding a one-piece Beetle urea bathroom or beauty parlor stool with a separate back. The stool is 11 in. in diameter and 15 in. high; the leg ribs are ⅝ in. thick at the top; the legs are ⅜ in. thick at the bottom; 6½ lb. of molding powder are used per stool. From England have come examples of compression molded burial caskets requiring material shots weighing up to 75 pounds.

With all the work currently being done, the multi-cavity molding of relatively small pieces, such as the Maytag washing machine agitator unit, in big groups—say 8, 10, or 12 at a time—will become more possible as further advances are made.

Materials and equipment

What does this whole problem of large molded pieces involve in the way of molding materials, preform equipment, presses, and material handling? What investment must be made by molders for this new field? To what extent can the piece size and weight capacity of present presses be extended to serve at least a share of the markets? The Directory in the 1948 "Modern Plastics Encyclopedia" lists 104 presses of from 500 to 900-ton capacity, 10 of 1000-ton capacity, 16 of 2000-ton capacity (12 of which are used for highly specialized purposes and therefore are not actually competing in the picture), and two of 2400 tons and over. Other large presses exist in the custom molding field, but are not listed by their owners. And, since the 1948 Directory was published, probably a dozen presses of over 1000-ton capacity have been installed. As recently as 1945, when General American Transportation Corp. ordered its first large presses, there were very few units in existence with a capacity of 800 tons. And there was practically no auxiliary overhead ram equipment for smaller presses.

Some idea of the size of this equipment may be gained from a study of the photographs accompanying this article. A press of up to 600-ton capacity can be mounted on the concrete floor of the plant; but for installation of a new 2000-ton press at General Industries, shown on page 55, it was necessary to go 10 ft. under the plant floor.

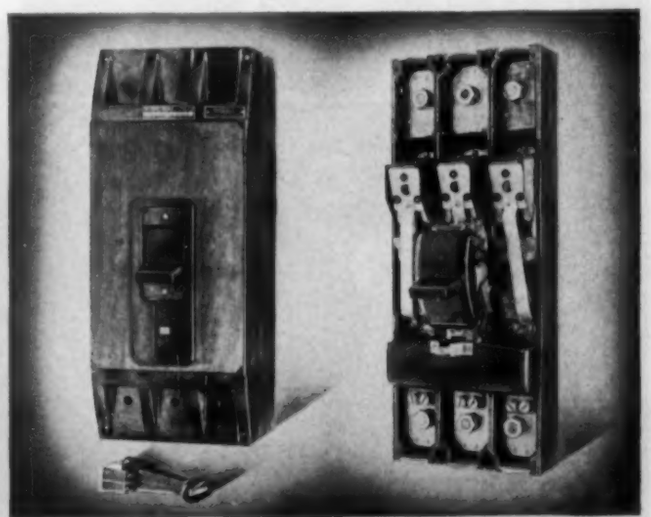
American Insulator Co., in the course of modernizing and rearranging its plant for increased production of big pieces, has just installed two 650-ton French Oil Well Machinery Co. presses and one 2000-ton Watson-Stillman press. The company is relocating its whole press setup to get a straight-line manufacturing process with an unbroken flow from the preforming room directly to the shipping room. This will eliminate a good portion of material handling formerly necessary. General American Transportation Corp. now has two 1000-ton presses, one 1200 tonner, one 1400 tonner, and two 2000-ton presses. General Industries have two 1000-ton presses and a 2000-tonner on the line. Molded Products Corp. is likewise moving further into this picture. Mack Molding Co., Wayne, N. J., has installed two Dunning & Boschert presses each of 1650-ton capacity. Others will follow.

For every big press will be needed big preform equipment and oscillators of higher than 15 kilowatts to handle the shots. There will also be needed either higher line pressure facilities or built-in hydraulic power for self-contained units.

(*Please turn to page* 60)

Loading 13 preforms weighing approximately 1 lb. each into a Philco television cabinet mold. A finished cabinet is shown in foreground

COURTESY BAKELITE CORP.



COURTESY I-T-E CIRCUIT BREAKER CO.

Base and housing of this 9 by 22 in. circuit breaker are compression molded of high impact asbestos filled phenolic

Molded in Australia is this urea-formaldehyde stool. The molding powder used weighs 6½ lb.; seat is 11 in. in diameter and stands 15 in. high. The legs are heavily ribbed to increase their strength

Seats and backs of all-purpose chair are molded; stool has molded seat. Urea and phenolic are materials used

COURTESY THONET BROS., INC.

The molds involved in large piece work on the extremely high pressure presses are foreign to general past practice in the industry. While the runs are generally not long, the steels used must be of the finest. Dies weighing many tons have to be tooled just as accurately as those weighing a few hundred pounds. And the cost of a die may run anywhere from $20,000 to $40,000. The die, made by Thorgren Tool and Die Shop, Valparaiso, Ind., and used for the Crossman-Brinkman tackle box, is mounted on a die set made by Danly Machine Specialities, Inc., Chicago, Ill., and designed by General American. This die cost over $20,000. The engineering problems involved are serious, particularly when annealing and hardening are involved and tolerances are close. Not only are the die-making problems for large pieces serious but the die maintenance problems impose on the molder the necessity of setting up large and modern equipment in his tool shop.

What about the point already mentioned of materials and methods interesting to those molders who would like to make bigger pieces on their present equipment? The answer, as pointed out in the October 1947 issue of MODERN PLASTICS, would seem to rest in molding compounds which would require much lower pressure yet would produce molded parts with strength, finish, and chemical resistance comparable to standard high pressure compression molding materials.

Durez has recently announced such a phenolic molding compound which compression molds with less than one third the pressure normally required for standard general-purpose material, yet is declared to have superior physical properties and equally good surface appearance. With heavy-press capacity severely taxed as it is likely to be, this material is expected to find wide use in extending the piece size capacity of presses of 500 and 600 tons. A television cabinet 24 by 24 by 24 in., made from regular general-purpose material, would require approximately 1600 tons pressure; the same cabinet produced from the new material could be molded with slightly more than 500 tons pressure. The lower pressure would mean less expensive molds, faster press action, a minimum of turbulence and friction during the flowing action, and lower mold maintenance.

In transfer and plunger molding, the new material is claimed to make possible larger molded areas with practically no increase in clamping pressure; it could make possible the plunger molding of areas up to 200 sq. in. on equipment that would produce no larger size than 45 sq. in. with standard phenolic materials.

Curing time of the new material is approximately the same as the standard Durez general-purpose powders if the maximum advantage of electronic preheating is utilized. High frequency preheating

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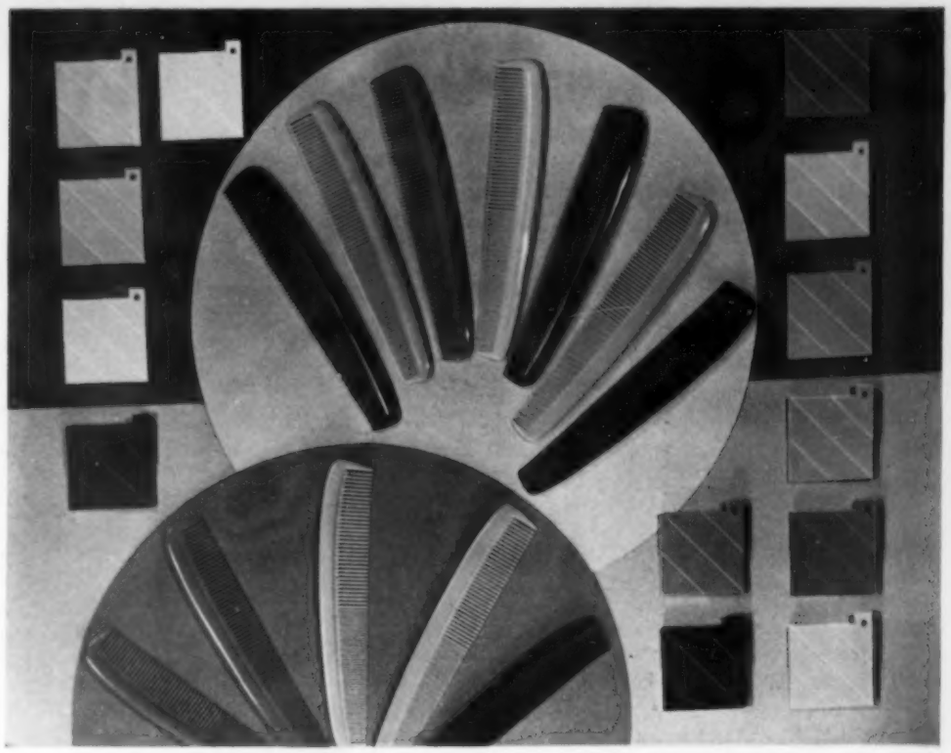


Combs and color chips show the range of colors in which nylon molding powder is available. Thirteen different colors are shown; three more colors have been put in production since the picture was taken. One additional color, jet black, will soon be added

COLOR PLATES COURTESY E. I. DU PONT DE NEMOURS & CO., INC.

Nylon in 16 Colors

NYLON molding powder, which was available only in natural color until recently, is now being produced in a range of 16 colors by the Plastics Dept., E. I. du Pont de Nemours & Co., Inc.

The colors available, in addition to the natural material, are buff, brown, gray, light green, dark green, deep green, two light blues, dark blue, peach, red, pink, orange, yellow, ivory, and white. One additional color, a jet black, is in the last stages of development and is expected to be in commercial production in the near future. The price of the colored nylon powder is slightly higher than that of the uncolored material.

The colored material, available only in the general purpose compound known as FM-10001, has all the properties of the natural-colored material. It is tough, and has a higher service temperature than any other thermoplastic material.

The colors are incorporated directly into the material and are permanent. They are not affected by molding temperatures, and articles molded of the colored material have the same resistance to heat (in some cases as high as 380° F.) as do items molded of the natural material. Thus, colored nylon products can be sterilized by steam.

Because of its marked fluidity at molding temperatures, FM-10001 is particularly well suited for molding articles with thin sections or articles with complicated inserts, where the flow of the plastic material around the insert is often a problem.

The availability of colors is expected to result in much wider use of nylon molding powders for the production of consumer items. The natural material has already proven itself for such applications as slide fasteners, combs, brush backs, tumblers, dishes, funnels, etc. In the struggle for a place in these fields, the lack of color was a disadvantage which nylon was able to overcome only because of its high heat resistance, durability, and resistance to dry cleaning fluids and ironing temperatures. With color possibilities as an added advantage, the competitive position of nylon molding powder should be greatly improved.

Previous to the introduction of the new colored nylon molding powder, articles molded of the natural material could be colored only by dyeing them in the same manner as nylon filament yarn is dyed. The resultant color had satisfactory abrasion resistance and would withstand boiling, but the dyeing process was costly and the color was not uniform. Parts of the surface where flash had been trimmed off, or where gates had been cut, did not dye the same color as the molded surface—a problem avoided with the colored molding powder.

Dress Patterns of Plastic Film

HOUSEWIVES who whip up frocks at home on their sewing machines have always had difficulty with proper fitting. Paper patterns require adjustment; tedious basting, fitting, and rebasting of material are necessary to achieve a professional look in the finished article.

The radically different approach of the Try-Onn pattern enables a woman to cut out a dress, sew it up, and know that it will fit perfectly without alteration. The Try-Onn pattern is actually a plastic half dress chain-stitched together. It can be tried on for style, length, size, etc., then taken apart and laid on material to be cut.

Polyethylene pattern is chainstitched together to form a half dress which can be adjusted for fit, length, etc.

Trion Pattern Inc., New York, N.Y., fabricates the patterns of two-gage Bakelite polyethylene film supplied by Visking Corp., Terre Haute, Ind. To avoid confusion, front sections of the garment are always pink, the back sections always white. Harry Collins, New York dress designer who created these plastic patterns, got the idea from muslins made for each customer ordering a custom dress. The muslin is fitted for individual figure variations and from it, the finished dress is made.

The steps which must be followed from the time the pattern is purchased until the garment is completed are simple. The pattern is first tried on and taken up or let out where necessary by means of pins. It is then taken apart and the various sections laid on the material. A 1-in. allowance for seams is provided. Instructions as to folds, direction of section on material, etc., are printed on the polyethylene. The sections are also notched as in tissue patterns to facilitate joining. As soon as a section is laid out correctly, the home dressmaker takes a powder puff and goes over the section with powder. Holes left by removing chainstitches and alteration pins allow powder to sift through and mark details for sewing. After the material is cut, sections are joined and sewn along the powder lines to give the correct fit.

The polyethylene film pattern is so durable that it may be used again and again without tearing. Different skirts and tops may be put together to make up new styles. At present, dress, coat, and suit patterns are available. Distribution is through department stores. Trion Pattern Inc. plans to add 18 new designs to its plastic pattern line every three months.

After adjustments have been made, pattern is taken apart by pulling out chainstitch (left). A section is then laid flat on material (center) and powdered so that alterations will show up on material. Fabric can then be cut (right).

An attractive 24-tube carton is used to package toothpaste tubes and the acetate dog heads. As a result of using the dog heads as a premium offer, sales of the toothpaste have doubled in test areas

Dog head, which is attached to carton top by means of a wire staple, serves as cap for toothpaste tube. In order to attract youngsters, key chains and bracelets with threaded plugs are offered as premiums

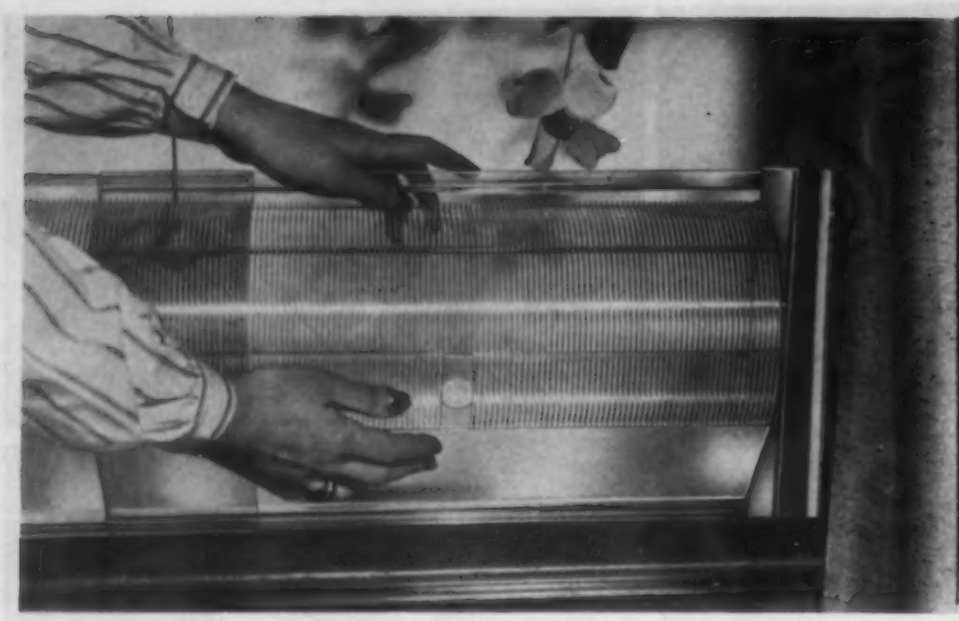
Acetate Premium Sells Toothpaste

SALES of Listerine toothpaste doubled in seven test areas, and in some cases went well above double normal volume, according to the manufacturer, as a result of a premium offer based on miniature dog heads molded of acetate. In deciding on these point of purchase premiums, the Lambert Pharmacal Co., St. Louis, Mo., aimed at the juvenile market. The company adopted the dog heads as caps for small size tubes of Listerine toothpaste and, by packaging them in an attractive 24-tube carton, assured that the merchandise would be given prominent counter display.

Actually, Lambert is using two premiums for this sales promotion. The first, which is a combination sale premium, is the miniature plastic dog head. The second is a self-liquidating premium. For this, children send 25¢ and a Listerine box top to Lambert and receive either a key chain for boys or a charm bracelet for girls. The key chains and bracelets each have six threaded plugs to which the dog heads with their molded-in threads can be readily attached.

At the present time the molded dog heads are affixed to the outside of the tubes' carton tops by means of wire staples. However, it is planned that eventually the dog head caps will be used as tube closures when jigs and fixtures have been made to accommodate the eccentric shape of the heads.

The miniature heads, which represent a collie, a cocker spaniel, a Scotty, a fox terrier, a boxer, and a German shepherd, are molded by the Plymouth Co., Plymouth, Wis. Three 12-cavity combination molds are used; there are six heads of two breeds of dogs on each die, making a total of 36 cavities. Some of the dies part in four directions in order to accommodate the deep undercuts on some of the heads. All of the molds have hot-hobbed beryllium copper cavities. The highly detailed hobs were engraved by the Comet Die and Engraving Co., Chicago, Ill. Three 8-oz. presses are used and the heads are molded on a cycle of approximately two shots per minute. Each of the six heads are molded in six different colors, the result being that Plymouth is actually molding 36 different products. Acetate was chosen as the molding material primarily because a soft material had to be used in order to give longer life to the expensive dies.



To put the vent-screen in working position, two slotted extruded strips are first tacked to the window frame. The ends of the vent-screen are then snapped securely into the slots. This method of mounting the plastic unit in the window permits full control of ventilation

Molded Window Vent-Screen

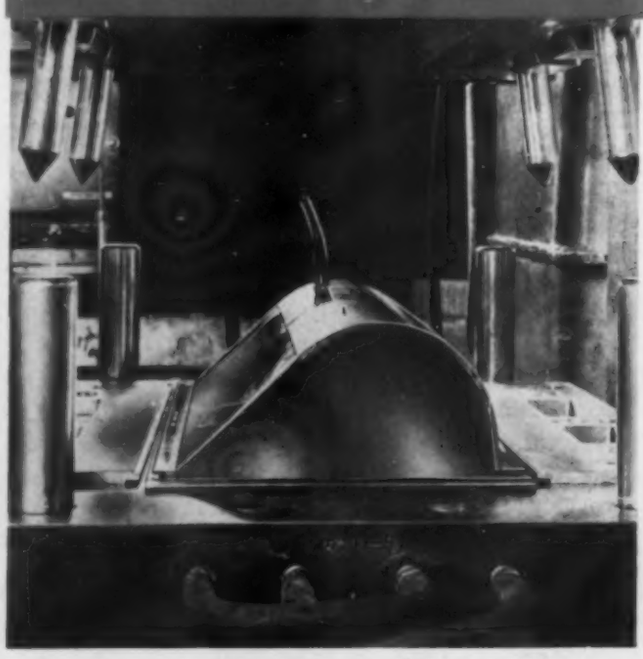
WHAT householder has not at one time or another raced through the house to shut the windows before a sudden driving rain has had a chance to do its damage? Many times at night no member of the household awakens in time, and the result is at least soaked drapes and puddles on the floor. But an end to such domestic disasters is in sight.

About two years ago the Pottsville Plastics Co., New York, N. Y., began development work on a new type of vent-screen designed to provide year around protection against not only rain, sleet, and snow but also against insects and soot. Its final production model, molded of polystyrene, is known as the Windo-lier. It is a combination vent-screen for year around use, designed to serve as both ventilator and window screen. The two-piece unit can either be set up for full ventilation simply by placing it in the open window and closing the sash on it, or, by mounting the ventilator in two plastic runners installed on the window frames, any desired degree of ventilation may be had merely by raising or lowering the window sash the required amount.

The Windo-lier sections are molded with approximately 118 slots, each narrower than the openings in standard window screening. Laboratory tests have proved that these tiny slots, placed as they are in the ventilator, will permit no water to pass through them even during a driving rain. Naturally, insects which are balked by window screening cannot get through the small spaces.

The two halves of the ventilator are designed to telescope so that the unit is fully adjustable for use in standard windows varying in width from 19 to 34 inches. Produced from Bakelite's and Gering's polystyrene in several transparent colors as well as water clear, the Windo-lier may be permanently

Single cavity vent-screen mold with molded part still on force plug. Bars for molding under-cut slot are retracted so that knock-out pins can raise the piece from force plug



left in its runners on the window frame without interfering with window operation. The colors available permit the purchaser to blend the ventilators with the decorative schemes of room interiors, regardless of their basic colors.

Mold making skill needed

In the design and production of the two single cavity molds required for this molding job, a great amount of skill was required, especially in machining those sections of the mold which produce the slots. These hardened steel projections in the cavities are required to press firmly against a mating surface on the force-plugs, thereby insuring that the slots "mold clean." At the same time these projections must be sufficiently strong so that they do not chip off during successive molding operations and ruin the mold.

The Sameric Engineering Co., Riverdale, N. J., molder of the ventilator, states that the molds for this job, produced by the Newark Die Co., Newark, N. J., were satisfactory even on the first trial shots. Because of the large area of the molded parts and difficult flow caused by the slots it was necessary to investigate different formulations of polystyrene in order to solve some of the molding problems. Each piece measures 18 in. long by 9½ in. wide by 4 in. deep and weighs approximately 1 pound.

Fast cycle

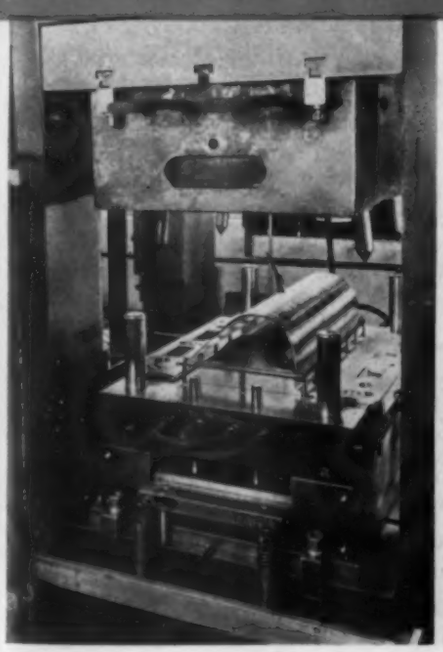
It is possible to run this job on a 60-sec. cycle, largely because both the heavy section force plug and the cavity are intricately cored for cooling water. Under-cut slots at the edges of each half of the ventilator, necessary because of the design of the unit, are produced by movable mold bars. Angle pins on the upper half of the mold move these bars into molding position and out again to release the molded under-cuts. This operation is controlled by the motion of the press. When the under-cut bars are moved out to the open position, the angle pins disengage from them and the bars are held by springs.

One of the photographs shows the mold in open position, the side bars for molding the under-cut slots retracted, and the molded piece raised from the force plug by the knock-out pins. After the sprue is roughly cut, the only finishing operation remaining is milling off that small section of the sprue which was not removed by cutting.

But little competition

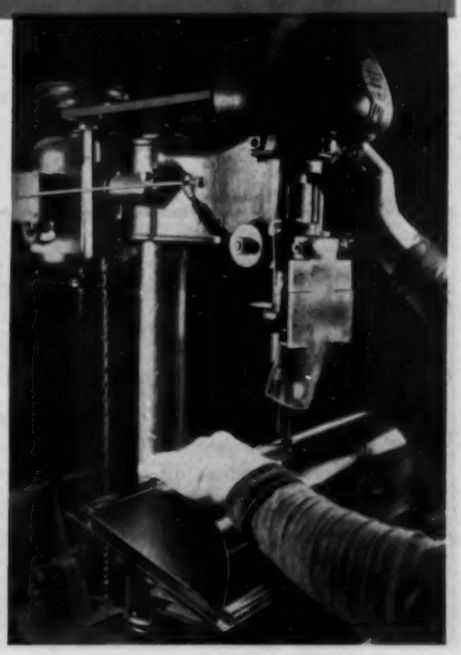
The development of this successful new plastic product shows the results which can be achieved when problems are faced squarely and adequate attention is given to design and engineering. The combination of the features of the ventilator is such that there is little or no competition from similar products produced in other materials. The consumer is offered a practical, utilitarian, household device which fills a definite need, is decorative yet unobtrusive, and which uses a plastics material to good functional advantage. It is on such bases that better plastics products are built.

Knockout pins have raised molded vent-screen part from force plug. Cavity and force plug are water cooled for fast cycle



Over-all view of 16-oz. De Mattia vertical injection press. The operator is removing one of the vent-screen parts from the mold

A special jig positions the piece for accurate milling of sprue flush to molded surface. This is only finishing required



PROGRESS IN

High speed production of housing for miniature motor is possible with flame-resistant acetate. Motor, made by Arpin Products Inc., Orange, N. J., is powered by flashlight cells

Toughness, flame resistance, and dimensional stability of Lumarith XF dictated its choice for Sunbeam Shavemaster housing molded by Chicago Molded Products Corp., Chicago

EXTENSIVE research work undertaken by the Plastics Div. of the Celanese Corp. of America on cellulose acetate having increased resistance to burning, resulted in 1945 in the introduction of the first flame-resistant injection molding compositions. These were grouped to form the Lumarith XF series, and included formulas in the H5 to H8 flow range inclusive. See "Flame Resistant Cellulose Acetate," MODERN PLASTICS, pp. 102-104, June 1945, and "Testing Flame-Resistant Cellulose Acetate," MODERN PLASTICS, pp. 119-121, February 1946).

The noteworthy flame resistance of these compositions was obtained by a combination of formulation and processing technique. However, not all the difficulties inherent in developing a new type of material were solved at that time, so that further research was necessary. As a result, early this year, certain improvements were incorporated into the Lumarith XF series, which now contains the compositions XF-H4, XF-H5, and XF-H7.

The problems of formulation had to be solved with a view to obtaining the best balance in appearance and properties of the moldings made from these flame-resistant materials. They included the selection of the most suitable cellulose acetate flake and the most advantageous blending with it of fire retardant plasticizers and of modifiers. The flake selected has been especially manufactured by the Celanese Corp. Its incorporation in the Lumarith XF compositions has imparted to them good dimensional stability, great chemical stability, and wider color possibilities. The fire-retardant plasticizers and other modifiers selected have good compatibility with the flake in the proportions used, so as to insure the least possibility of either exudation or poor conversion.

The flame-resistant cellulose acetate formulations discussed are based on a specially developed flake combined with flame-retardant plasticizers and modifiers. Most recent formulation gives a softer flow flame-resistant material than heretofore available. Reported are physical properties of XF formulations having good dimensional stability, wide color range, and low water absorption values. Recommended practices are outlined for handling the materials in molding.

Plasticizer governs flame resistance

As the flame-resistant characteristics are in large measure imparted to a composition by the fire-retardant type of plasticizer contained, it follows that the presence of this ingredient in increasing quantities promotes increasing flame resistance. But Lumarith XF compositions in a flow range softer than H4 are not available commercially at the present time because the amount of this type of plasticizer which could be added is limited by its compatibility. Softer flowing compositions can be produced by the addition of other normally used plas-

FLAME-RESISTANT CELLULOSE ACETATE

Improvements have made a group of specialty materials of even broader interest for applications where flame resistance is important

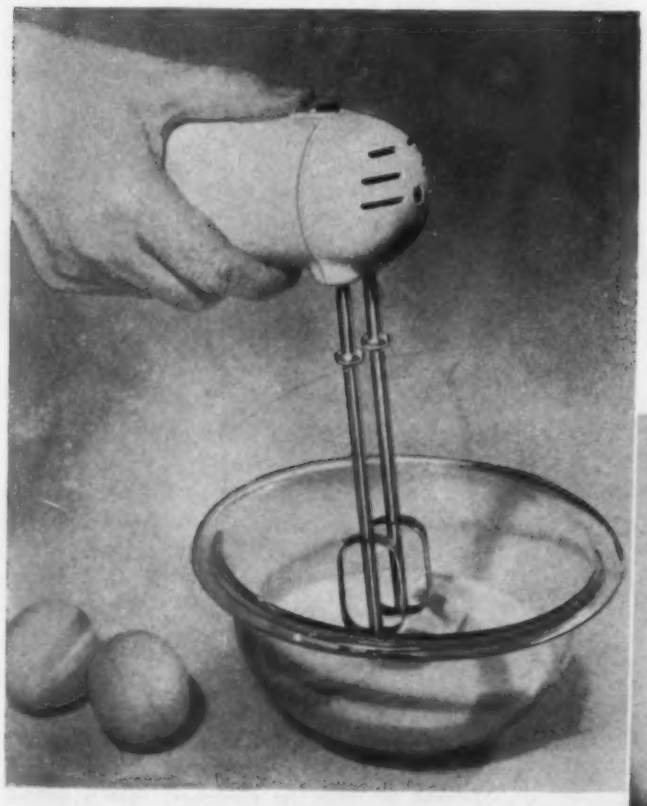
by DR. MARIE BENTIVOGLIO*

ticizers, but this does not favor flame resistance in the resulting molded part. Lumarith XF compositions do not make use of fire-retarding pigments, the presence of which usually increase specific gravity and limits the color range.

The standard test for determining the flammability rate of plastics materials of cross section greater than 0.050 in. is described in Test Method D635-44, of the American Society for Testing Materials. It is in accordance with this test that the relative degree of flammability of cellulose acetate molding materials has been established, and that the terms "flame-resistant" and "self-extinguishing" must be interpreted. Crude tests for determining flame resistance, such as igniting a molding with a match, are of little significance because of the many variables which are involved in making such tests.

In the A.S.T.M. test mentioned above, a bunsen burner or alcohol flame is applied to a test specimen for 30 seconds. The flame is then removed and the specimen allowed to burn. In case the plastic does not continue to burn after the first ignition, the flame is applied for a second period of 30 sec. immediately following the extinction of the flame. If the sample does not continue burning for a specified distance after the second ignition, the sample shall be reported as self-extinguishing.

Thus a specimen may ignite twice, as the flame is applied, yet if it fails to support combustion till burned, it is classified as self-extinguishing. Among the cellulose acetate molding materials, only the special flame-resistant compositions have this property.

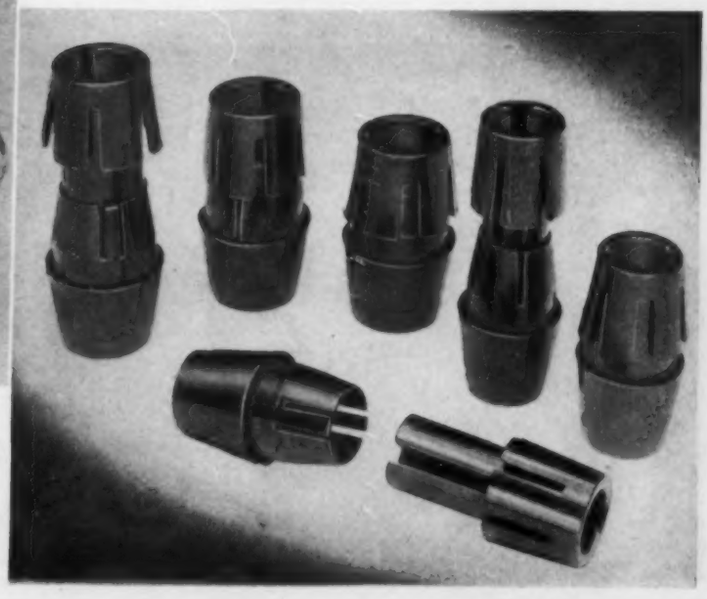


Lumarith XF housing for portable mixer is molded by Norco Plastics Co., Milwaukee, for John Oster Mfg. Co., Racine

Product tests

It is primarily because of their low order of flammability that the Lumarith XF materials have been in demand for a number of applications in the electrical field, where the approval of the Underwriters' Laboratories is desirable. The tests made by the Underwriters' Laboratories are designed with a view to determining the degree of safety in service of a particular assembly or product (as, for example, an electric razor). Tests are, therefore,

* Laboratories, Celanese Corp. of America, Newark, N. J.



Flame-resistant cellulose acetate cable grommets for ship bulkheads will outwear the lead grommets previously used

devised for each commercial application, based on its particular functionability and design, and they are usually conducted on complete assemblies. As each product is submitted to appropriate tests and is judged on its own merits, the increasing use of Lumarith XF materials in products which have obtained Underwriters' Laboratories acceptance, attests to the importance of the greater factor of safety provided by this flame-resistant cellulose acetate.

However, the success of Lumarith XF molding materials also depends on other properties in addition to their fire-retardant qualities. They have good dimensional stability and heat resistance, and they retain an excellent balance between these properties (which are particularly valuable in the electrical field), and the highly desirable characteristics of strength and toughness which are associated with cellulose acetate moldings. It is this well-balanced combination of properties which makes Lumarith XF compositions a welcome addition to the family of cellulosic molding materials. They are also the first hard-flowing cellulose acetate materials to show a water absorption value of less than 2% (ASTM Test Method D570-42). The physical properties of this series are listed in Table I. The Lumarith XF series exhibits the excellent electrical insulation characteristics of regular cellulose acetate.

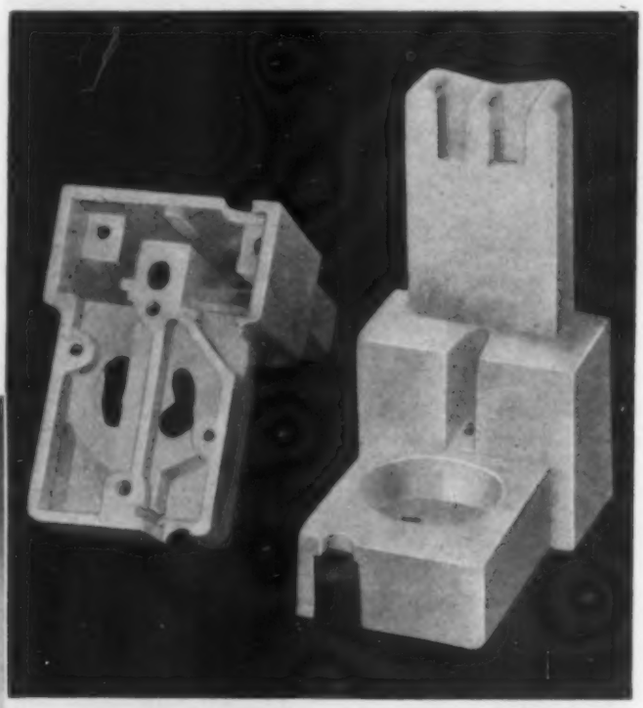
Table I. — Properties of Lumarith XF Series

Property	Unit	ASTM method	Conditioning of specimens before testing						
			Temp.		Rel. hum.	Time			
			°C.	°F.	%		H4	H5	H7
Flow temperature	°C. °F.	D569-43	25	77	0	3 days	165 329	170 338	180 356
Specific gravity	Gms./cc.	D792-48T	..	..	..		1.30	1.30	1.304
Rockwell hardness	R scale	D229-42	25	77	50	4 days	107	99	117
Impact strength (Izod)	Ft. lb. per in. of notch	D256-47T	25	77	50	3 days	1.9	2.1	1.6
		D758-44T		—40	..	1 hour	0.3	0.3	0.3
Distortion under heat	°C. °F.	D648-41T	25	77	50	3 days	56 133	54 129	72 162
Deformation under load (1600 p.s.i.) at 50° C	Change in height %-24 hr.	D621-45T	25	77	50	3 days	7.7	16.5	3.0
Tensile strength	p. s. i.	D638-46T	25	77	50	14 days	6700	5600	7400
Flexural strength	p. s. i.	D790-45T	25	77	50	2 days	8870	7250	11700
Water absorption (Wt. gain in 24 hr. immersion plus soluble matter lost)	%	D570-42	50	122	..	1 day	1.5	1.8	2.1
Soluble matter lost	%						0.7	0.3	None
Weight loss on heating for 72 hr. at 82° C. (180° F.)	%	D706-46T	25	77	0	2 days	1.6	2.4	0.5

Colors improved

An outcome of the more recent development work on this series has been the improvement in color range. Lumarith XF-H5 is available in a wide range of light transparent, translucent, and opaque colors, whereas XF-H4 and XF-H7 remain available in dark colors and black; the latter material is used mostly as a mottle component. Light colored stock requires the same care and attention in molding as is given to similar colors in other hard formulations. The injection or extrusion molding procedure must be well controlled in order to avoid the possibility of discoloration and streaking.

Of special interest is the fact that moldings of



U.L.-approved tombstone for fluorescent light is molded of Lumarith XF by Bryant Electric Co., Bridgeport, Conn.

American Insulator Co. molds Lumarith XF housing for new type electric razor made by New Electric Corp., Baltimore

Transparent Lumarith XF lightning arrester made by L. S. Brach Mfg. Corp., Newark, N. J., has neon gas tube inside

Dormeyer mixer has handle, indicia ring, and selector ring molded of Lumarith XF by Industrial Plastics Co., Chicago

Facial vibrator made by Ben Lee Products, New York, has Lumarith XF housing by R & H Plastics, Inc., Newark, N.J.

Lumarith XF possess an exceptional gloss and surface luster, which give added sparkle to the color of the plastic and a desirable appearance to the product.

Molding practices

The following practices, which are based on laboratory and field experience, are recommended for the injection and extrusion molding of Lumarith XF materials:

a) Stock must be well dried before molding.

b) The weight of a shot should be from about 55 to 70% of the rated capacity of the injection machine. For example, when using an 8-oz. machine, the weight of the shot should be from about 4.4 to 5.6 ounces. This avoids 1) keeping the molding material too long in the cylinder, as results when the shot is small relative to the capacity of the machine, and 2) using the high cylinder temperatures required when the machine is operated at full rated capacity.

c) No more than 20% regrounds should be used normally with virgin material, and it may be necessary to reduce this percentage with lighter colors in order to obtain the best results.

d) Lumarith XF material must not be allowed to stand in a hot cylinder. It should be kept moving. The cylinder must be purged by pushing out all the XF material with regular cellulose acetate before any protracted shutdown of operations, such as for smoking periods, lunch hours, or overnight. Continuous operation, 24 hr. a day without interruption, is strongly recommended.

e) Lumarith XF material has the same compatibility with different types of molding materials as other cellulose acetate formulations. The same precautions against contamination should be observed.

Eye and sales appeal

The Lumarith flame-resistant compositions have added a valuable specialty group to existing cellulose acetate materials. Their specific properties have created a demand for them in the electrical field and for other particular applications where flame-resistance was a critical requirement. They have been extensively used for housings of small motors, such as are used for shavers, drills, vibrators, and mixers. Here color, toughness, the low order of flammability, and the possibilities for attractive design combine to give an eminently serviceable enclosure with eye and sales appeal.

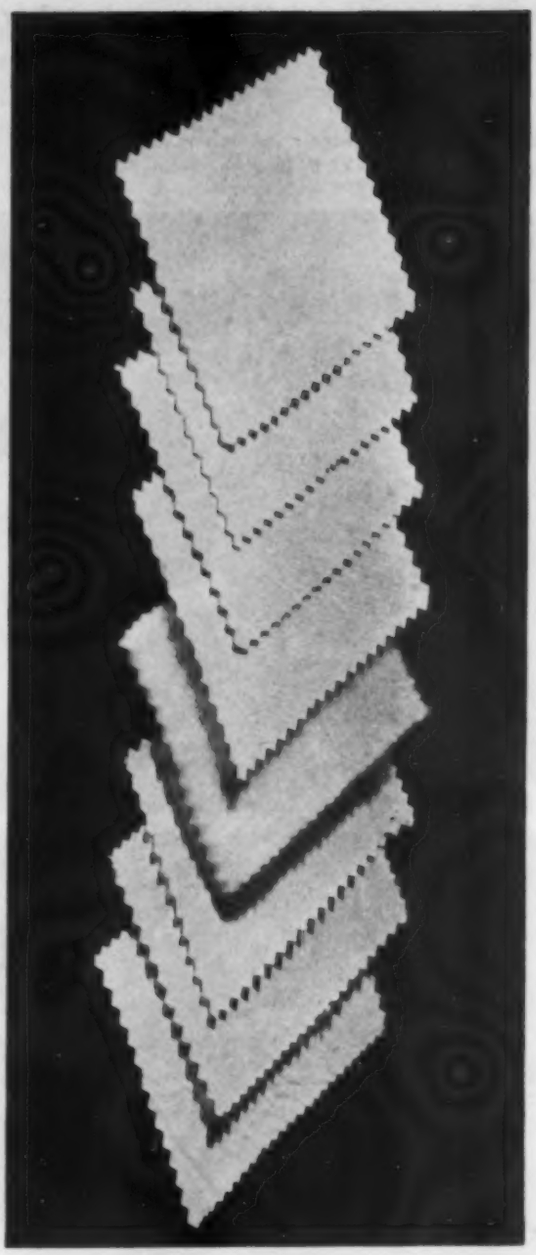
Non-Woven Filler for Laminates

Already finding industrial applications, new filler lends desirable mechanical and electrical properties to high or low pressure laminates.

AFTER some two years of pilot application work and field testing, a new group of bonded fabrics for use as fillers in high and low pressure laminates and coated fabrics is announced by Wellington Sears & Co., New York, N. Y., sales agents for West Point Manufacturing Co., West Point, Ga.

The new fabrics, under the trade name of "Lantuck", are, like other bonded fabrics, neither spun nor woven. But they differ from previous bonded fabrics in that they have almost completely random distribution of fibers and thus have equal strength in all horizontal directions.

At present there are six standard "styles" in the line, each different in fiber structure and each bonded with different percentages (from 5 to 35%) of different synthetic resins, depending on the final application. For high pressure laminating, as an



New resin-bonded fabric is made from different fibers, different resins, according to end use

Comparative Physical Properties of Cotton-Filler Laminates

Laminate made from Lantuck		*ASTM and NEMA specifications*		*Results from survey of commercial laminates made using woven cotton fabrics*[a]		
		Grade L	*Grade C*	*Maximum*	*Average*	*Minimum*
Tensile strength (p.s.i.)	16,900	7,000	7,500	12,000	9,600	8,300
Flexural strength (p.s.i.)	21,850	15,000	16,000	21,900	18,400	15,600
Izod impact (ft.-lb./in. of notch)						
Machine direction—Face	6.2			6.3	4.5	3.5
Edge	2.7			2.5	2.5	2.1
Cross direction—Face	7.5	2.5	3.2	6.8	4.3	3.4
Edge	2.6	1.2	2.0	2.4	2.4	1.9
Compressive strength (p.s.i.)	43,000					

[a] "Cotton Fabric Laminates," by R. E. Witt, F. D. Wolfe, and D. M. Rust, MODERN PLASTICS *25*, 123 (May 1948). Cross directional values are taken for comparison of tensile and flexural strengths.

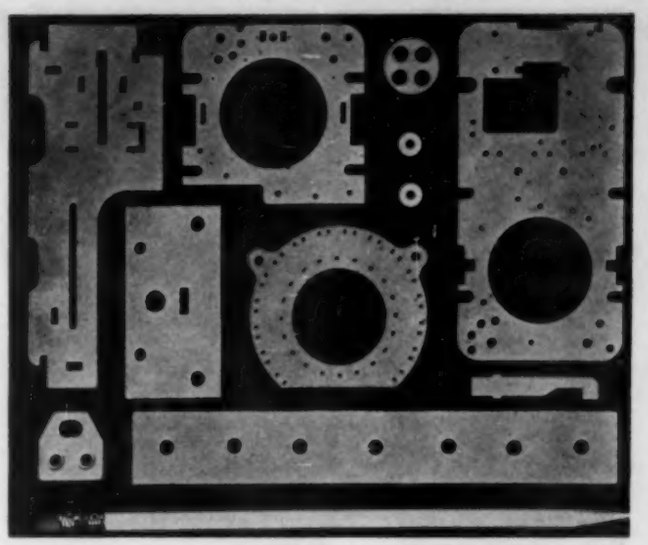
example, the fibers are of cotton; for low pressure work they may be either cotton or a viscose rayon or a mixture. There is no apparent limit to the number of styles that can be made. The resin used for bonding depends on the resin to be applied as a coating for the fabric in preparation for use either as a laminate filler or as a base for thermoplastic coatings. In other words, the proposed application in all cases determines the fiber used, the structure or style of the filler, and the type and amount of resin used in the bonding.

The new fillers will not compete in price with paper, but they will compete with woven fabrics and, in some cases, with glass. In general they cost between 10 and 15% less than woven fabrics of comparable strength and properties and they handle quite as easily. They may also be used in lay-up laminates and in molded laminates in combination with paper, cotton fabric, and macerated material. The moisture content of Lantuck is normal to woven fabric made from the same fiber.

In industrial laminate

First standard application of the material is announced by The Formica Co., Cincinnati, Ohio, in its new RN-30 industrial laminate which is claimed to have lower moisture pickup and thus better electrical properties than woven fabric laminates; improved impact strength in all directions, especially against repeated impact; exceptionally good cold punching properties; smoother finish; and the ability to be machined at much higher speeds.

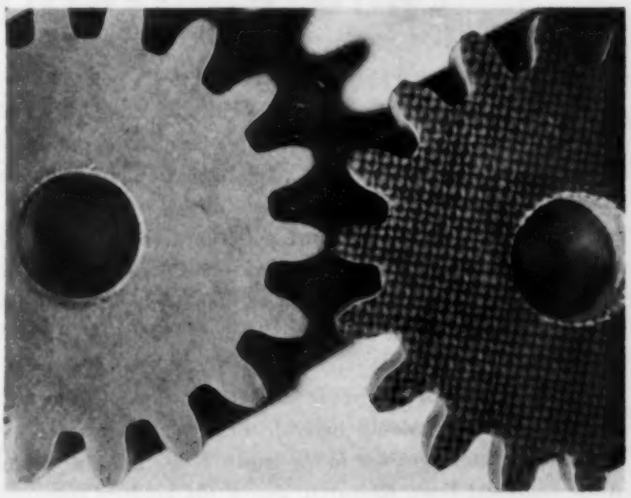
Formica's RN-30 has its first application in fine gears and electrical parts with small projections which must bear stresses in operation yet must be susceptible to fabrication at high speed and to economical machining. A wide variety of mechanical and electrical applications is predicted for this particular laminate.



PHOTOS ABOVE AND BELOW COURTESY THE FORMICA CO.

Punching qualities of RN-30 laminate are shown by tiny teeth on the small gears and by the sharp, clean edges of other small stampings. Note pencil at bottom for scale

Non-woven filler in gear laminate (left) provides more uniform strength in all directions than woven fiber



S.P.I. Annual Conference

THE CHALLENGE of present economic trends will keynote the 1949 S.P.I. Annual Conference at the Edgewater Beach Hotel, Chicago, Ill., May 26 and 27. Emphasis on new markets for plastics will be placed by prominent speakers at the morning session on May 26th. The John Wesley Hyatt Award will be made at luncheon on the same day. Injection molders and fabricators divisions will meet in the afternoon. During the Conference the Dow Chemical Co. will present a program dealing with the merchandising situation as it affects plastics suppliers and molders.

The business meeting will be conducted at luncheon on May 27, where the Informative Labeling Committee report will be presented along with others and names of new officers will be announced. Afternoon group meetings will be held for the tool, die, and machinery division. The Annual Banquet will be the feature of the evening.

Willard H. Dow

WILLARD H. DOW, president of the Dow Chemical Co.; his wife Martha; Mrs. Calvin Campbell, wife of the head of Dow's legal department; and two pilots were killed in a crash of the company's private plane near London, Ont., on March 31. Dr. Dow, recognized as one of this country's leading businessmen, was even more noted as a chemist. He had been president of Dow Chemical since 1930, when, at the age of 33, he succeeded to that position upon the death of his father, Dr. Herbert H. Dow, who founded the company in 1897.

Dr. Dow was generally regarded in the industrial fraternity as one of its outstanding individualists. The success of his company is often credited to the result of his thinking along unconventional lines. Research, one of his greatest interests, is symbolized by the tremendous research staff and laboratories now a part of the firm.

Of all the top executives in chemical companies, it is doubtful that there is a single one who was more confidently enthusiastic of the future of plastics than Dr. Dow. As far back as November 1945, Dr. Dow was quoted in the MODERN PLASTICS NEWS BULLETIN as saying: "We cannot foresee where the growth of this industry and its capacity to provide employment may even begin to level off." At the same time, Dr. Dow predicted that his company would produce 150,000,000 lb. of plastics annually by the end of 1950. There are many indications that the company will meet that goal. Said Dr. Dow at that time: "The big job the plastics industry faces today is that of producing basic plastics materials in sufficient volume so that cost or supply problems will not prevent them from stepping into the jobs for which they are ideally suited . . . our first concern should be volume production to meet this demand. . . "

The almost uncanny vision of Dr. Dow is largely responsible for his company's outstanding part in making synthetic rubber and light metal magnesium available in this country during the war years. His company was also the first to make available large commercial quantities of styrene monomer, a constituent in the manufacture of synthetic rubber. His company built a magnesium plant with its own funds, despite a lack of interest on the part of the armed forces before the war.

Dow Chemical is now one of the largest producers of coal tar and petroleum chemicals, including such items as aspirin, phenol, dyes, insecticides, and weedicides. The company is currently the largest producer of polystyrene in the world; the only producer of saran polymer; and also manufactures ethyl cellulose flake and compound. Many other chemicals which are used by the plastics industry are produced in the Dow plant.

The plastics industry will sorely miss Dr. Dow's contagious enthusiasm, his sound judgment, and his unerring ability to foresee and anticipate both the technical and merchandising needs of the times. The current Dow promotion campaign to sell plastics of the right design and proper application had the enthusiastic support of Dr. Dow himself.

Dr. Dow was born January 4, 1897, at Midland, Mich., the son of Dr. Herbert Henry Dow. He received his early education at Midland High School and later attended the University of Michigan, where he received the bachelor of science degree in chemical engineering in 1919. He began work for the Dow company that same year. In 1922 he became a director of the company and four years later was named assistant general manager.

Dr. Dow was also president of the Ethyl-Dow Chemical Co., Midland Ammonia Co., and Dow Chemical of Canada, Ltd., and a director of these companies and of Dowell, Inc., Dow Magnesium Corp., and Dow Corning Corp.

Dr. and Mrs. Dow leave a son, Herbert H. Dow II, who is a student at Massachusetts Institute of Technology, and a daughter, Mrs. Helen Dow Whiting of Midland.

In October 1948, Dr. Dow received the Medal for the Advancement of Research, an award of the American Society for Metals. On November 9, 1946, he received a medal from the Society of Chemical Industry for conspicuous service to applied chemistry, and another, on the same day, from the magazine, SCIENCE, in recognition of his scientific contributions during the war years.

Dr. Dow was a member of the Chemical Advisory Committee, Army and Navy Munitions Board; a member of the Chemical Warfare Service Advisory Board; a director of the American Chemical Society; a member of the American Institute of Chemists and the Society of Chemical Industry; and a member of the Corporation, Massachusetts Institute of Technology.

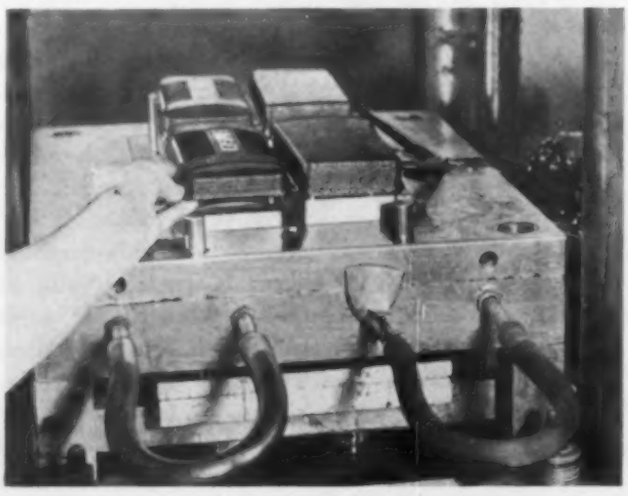
Four molded-in front pockets hold the various sized buttonhole templates. Ribs projecting from the inside cover have sufficient spring to hold the buttonholer securely in place when the box is closed, yet will not scratch the parts

Self-Hinged Polyethylene Box

A DELIBERATELY unorthodox approach to design of a plastics product, taking the fullest advantage of all the properties of the material, frequently leads to the opening up of new markets. Where extreme flexibility, electrostatic qualities, or even brittleness of a material is made the dominant factor in a product design, the result can be a "bellwether" application.

The Auburn Button Works, Inc., Auburn, N. Y., has applied for a patent on a recent example of this approach, the product being a polyethylene box designed by Egmont Arens to hold the parts of a buttonhole attachment made by the Greist Mfg. Co., New Haven, Conn., for the Singer Sewing Machine Co. The use of polyethylene makes possible a "built-in" hinge, produced by permitting a thin web, connecting the bottom and cover of the box, to be formed during molding. The hinge is so well designed and engineered that test samples have withstood over 70,000 openings and closings with no damage to the hinge.

Attached bottoms and covers of two boxes are molded in one shot. Any resultant flash is removed by flame trimming



The leather-like surface grained box is run in a two-cavity mold on a 22-oz. Impco press. Two bottoms and two covers, hinged together, are made in one shot.

Four pockets are formed against the front side of each box by air-cooled plugs. These pockets hold templates used to make different size buttonholes. A flat steel plate, used in the assembly of the buttonholer, is retained between ribs which project from the bottom of the box. The main part of the buttonhole attachment itself rests on two cross ribs molded into the plastic box; ribs inside the cover of the box hold it in position when the box is closed.

Measuring 7½ by 3¾ by 2⅜ in. high, the box is provided with a snap fastener. Because of the low specific gravity of polyethylene, the box weighs less than 6 ounces. Black Bakelite polyethylene is currently being used.

The whole field of permanent kit packaging, embracing medical and scientific instruments, precision tools, accessories for cameras and other devices, and even manicure and cosmetic kits is open to this new hinge principle.

Proposed designs for applications of flame-resistant cellulose acetate by the electrical industry go in sales kit dramatized by sample of a mixer housing which has already been proved in production

New Selling Slants on Cellulosics

EVERY person in the plastics industry knows that cellulose acetate molding powder production has suffered a decline since lower cost polystyrene became easily available in 1947. From a high consumption of over 80,000,000 lb. in 1946, acetate and butyrate consumption dropped to 48,000,000 lb. in 1948. Obviously, the producers of cellulosics must either curl up their tails without a whimper and accept the decline in their market as inevitable or go out and battle to regain their lost territory.

Hercules Powder Co., manufacturer of acetate flake from which the molding powder is made, and which has itself started the manufacture of molding powder in very limited quantity, gave notice at the recent S.P.I. meeting in California that it expects to go out after every application that can be satisfactorily molded of cellulose acetate, regardless of any cost or other differential between its product and competitive materials.

Late in 1947, 12 men from its sales staff were assigned to the job of making a survey of the plastics industry to report on the shift in markets and trends. In the ensuing 3-month period, approximately 1100 calls were made on molders, designers, consultants, fabricators, store buyers, and end users. The conclusion reached was that cellulosics are certain to have an important place in the present and future plastics picture, but that the place could never be reached without the aid of a powerful promotional and selling job. Accordingly, a campaign was set on foot to maintain current markets, recover lost markets, and develop new markets. Carefully planned sales kits were prepared which included samples of currently successful applications, such as the new Fuller brushes, fish lures, toys, etc. Then Hercules went after new markets.

The first big job was to find new products that could be satisfactorily molded from acetate. To help translate the company's ideas into concrete examples, the services of the industrial firm of Sundberg-Ferar, well-known designers of plastics products, were engaged to prepare plans or blueprints of items that were carefully picked as having the greatest potential.

The electrical appliance industry seemed most promising and permitted use of the newly developed flame-resistant acetate compound. The first sales kit was built around a molded housing in flame-resistant acetate used by A. C. Gilbert Co. for its Whirlbeater mixer. New designs for similar electrical appliances incorporating flame-resistant housings include those for a small hobby kit hand tool, an electric fan, a hair drier, and a small hand vacuum cleaner.

It cannot be emphasized too strongly that the proposed designs were based on what appeared to be sound uses. There was no random hit or miss guessing. And the drawings were accompanied by brief molding suggestions. Leading appliance manufacturers were consulted for ideas that would make the finished products most practical. The completed sales kits were mailed to molders and designers and delivered in person to the engineering and sales personnel of 120 electrical appliance manufacturers. It is significant that three of these carefully chosen suggestions for new products already have been — or are being — translated into new cellulosic finished products.

Similar treatment was given a case study directed to the toy industry. A 10¢ toy truck already in production was accompanied by designs for a jet bow, a pounding toy, a truck with several bodies, and roller skates. The kits were mailed or delivered in person to molders, designers, and toy manufacturers. The pounding toy and jet bow are now in production, and molds are being built for

the truck design. Other new toys are in various stages of preparation.

Currently a case study featuring designs for office equipment is being distributed. It includes a portable typewriter housing, small calculator housing, housing for inter-office communication equipment, housing for a pencil sharpener which could be molded in a flame-resistant cellulose acetate for an electric model, or in high acetyl cellulose acetate for a hand operated model.

Other case studies now being prepared to be beamed at the tool industry will feature both ethyl cellulose and cellulose acetate tool handles and housings; another kit will feature acetate laminates in the furniture, household, transportation, radio and television, and luggage industries. The tool case study will include a small pocket screw driver with an extruded ethyl cellulose handle; the laminate sales kit will consist of suggested new designs enclosed in an 8½ by 11 in. case made from two drawn laminates with a zipper closure.

Old markets also promoted

The campaign was carefully planned to place emphasis on old as well as new products. Case studies similar in pattern to those for new products were distributed to boost sunglasses and holiday goods, the latter including a cowboy and bronco molded in cellulose acetate and decorated by a new "spray-plated" technique.

To supplement this direct promotional effort, trade journal advertising has featured each specific market. A large number of additional leads were obtained from these ads. The company has not only told where the materials can serve, but has gone one step further and shown how to adapt a specific material to a given application. The tie-in of industrial design with selling and advertising has made it practicable for end users to take advantage of the services of a well-known designer in the development of new applications, or the redesign of current applications. Up to the point of building models, the design costs have been carried by Hercules. The cost of models is paid for by the potential customers.

Specific results

The program has been under way only one year, and it is too early to report any great number of jobs in production; the development of new end uses is a slow and tedious process. However, that the response has been good is shown by the list of results to date:

1. Flame-resistant cellulose acetate plastic housings have been designed for knife sharpeners to replace metal, and models built. Dies are under construction.

2. A flame-resistant cellulose acetate housing for a low-cost floor waxer has been designed.

3. A toy cash register bank formerly in metal has been redesigned with a cellulose acetate plastic housing, and model built.

4. A carpenter's plane has been redesigned with ethyl cellulose handles, and models built.

5. Electric clock housings have been designed and modeled.

6. A push drill has been designed with an ethyl cellulose handle. Models have been built and an order for 30,000 handles has been placed. Will be on the market June 1.

7. A model of the pounding toy shown in the toy case study designs has been built followed by dies and the item is now in production.

8. The jet-bow shooting toy also featured in the toy case history has progressed to the production stage.

9. The same applies to the truck chassis with changeable bodies.

10. A home tool kit, housed in a cellulose acetate box which can be hung on a closet door, has been designed which contains hammer, screw driver with ethyl cellulose handle, pliers, steel tape measure in an ethyl cellulose housing, and a transparent cellulose acetate oil can. The kit also contains a drawer for picture hooks, nails, tacks, screws, etc. A model has been built and dies are under development.

11. An ethyl cellulose handle for an electric hedge clipper has been designed and placed in production.

12. Numerous items based on cellulose acetate cloth laminates have been designed, including carpet sweeper housings, automotive applications, luggage, etc.

13. Hair driers have been designed, models built, and Underwriters' Laboratories testing conducted. Molds will be built in the near future.

A realistic approach to the problems of the acetate industry appears to be paying off.

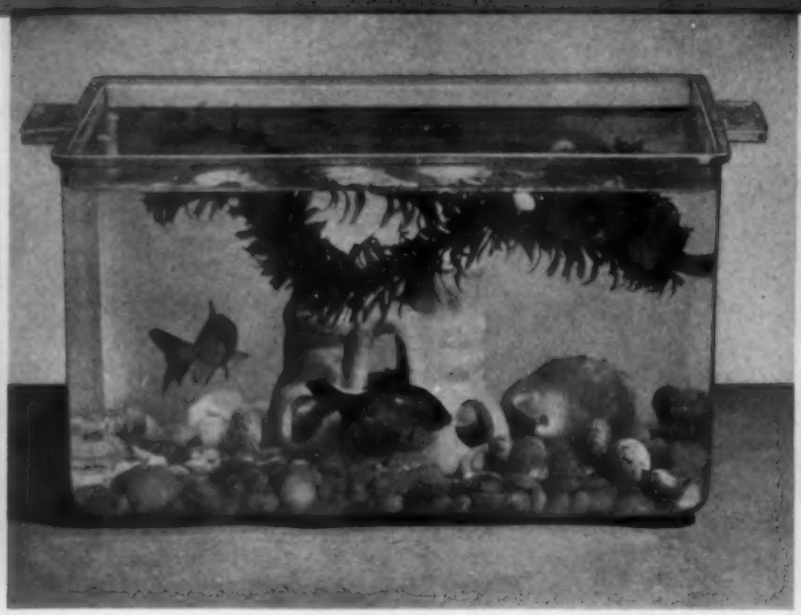
Interest spurred by sales kit advocating acetate for use in toy field has already resulted in new production items

PLASTICS PRODUCTS

Exactly one level tablespoon of coffee is dispensed with each quarter turn of the control knob on the Coff-Metr. No spoon is needed to measure the coffee, and none of it spills. The dispenser has four parts, all molded of polystyrene: the main housing, the cap, the knob, and the X-shaped measuring tumbler. Molded in two contrasting colors by William Thoresen Co., 2035 W. Wabansia, Chicago, for Steward Industries, Inc., 3455 N. Clark St., Chicago 13

The new Kodak Color Densitometer, used for measuring the density of transparent or translucent materials, has a phenolic housing and a black viewing tube and yellow scale molded of Tenite II cellulose acetate butyrate. Norton Laboratories, Inc., Lockport, N. Y., molds the butyrate and phenolic parts for Eastman Kodak Co., 343 State St., Rochester 4, N. Y.

An adjustable bird bath, designed to fit any cage, is molded in two parts of transparent Lumarith cellulose acetate by Boonton Molding Co., Boonton, N. J., for Hinton & Co., Inc., 67 Murray St., New York. Guard around base of cage to keep bird seed from being scattered on the floor is manufactured by Hinton from transparent extruded acetate sheet



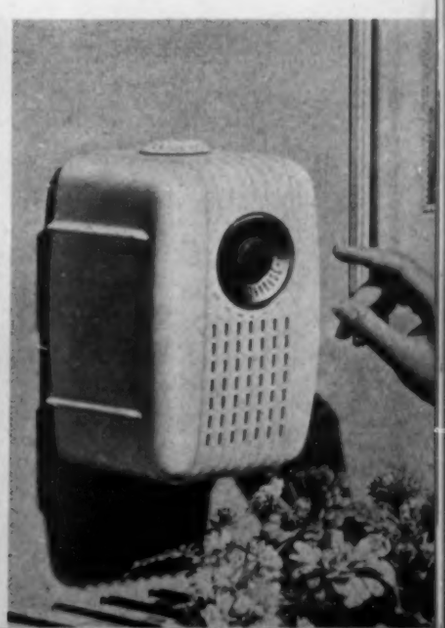
The attractiveness of a small home aquarium is enhanced by anything which makes it look more like the natural habitat of the fish. This Lustrex polystyrene aquarium looks more natural because it has an aquamarine tint which makes the water in it look like deep sea water. Molded in one piece (9 by 6 by 5 in.) by Majestic Molded Products, Inc., 22-01 41st Ave., Long Island City, N. Y., for Gould Novelties, Inc., 1657 Broadway, New York 19

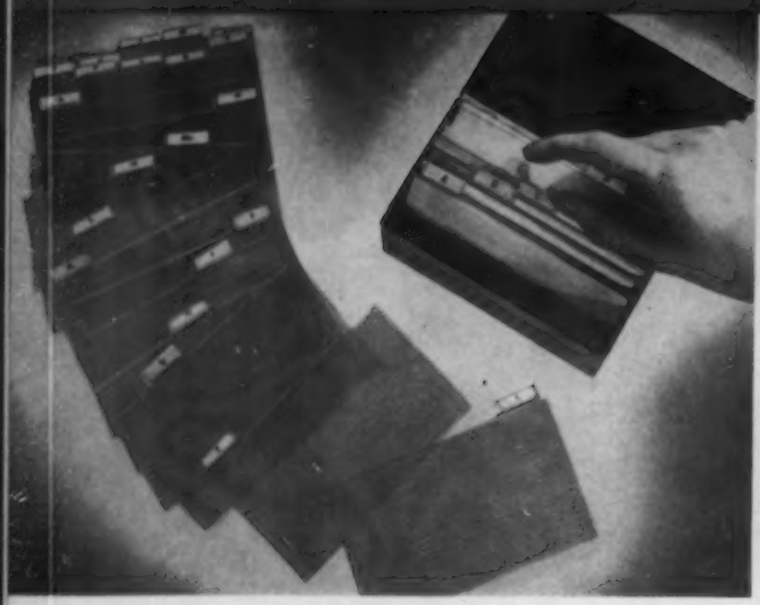
Drop a needle in the Thread-a-matic, draw some thread through the slot, press a button, and presto!—the needle is threaded. The base, housing, and button are molded of Lustrex polystyrene by Majestic Molded Products, Inc., 22-01 41st Ave., Long Island City, N. Y., for W. C. Burroughs Co., 225 Fifth Ave., New York

Reaming and screw-driving set consists of an amber handle molded of Tenite II cellulose acetate butyrate and three sizes each of interchangeable screw driving and reaming bits. Made by Park Metalware Co., Inc., Orchard Park, N. Y. Box in which the set is packaged is molded of transparent butyrate

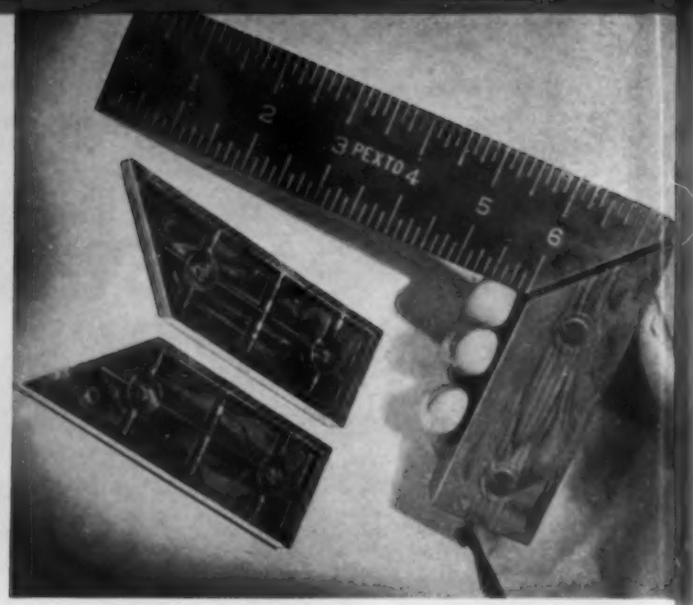
New 1949 official Boy Scout Pocket-Lite has luminous lens cap molded of Lustrex polystyrene with luminescent pigments made by New Jersey Zinc Co., 160 Front St., New York. The flashlight is made by Bantam-Lite, Inc., 126 11th Ave., New York

Wall model radio is easily accessible, but safe from prying hands of children. Housing is molded of ivory, maroon, blue or green Plaskon urea by Joseph Stokes Rubber Co., Ltd., Welland, Ontario, for Westinghouse Electric Corp. of Canada





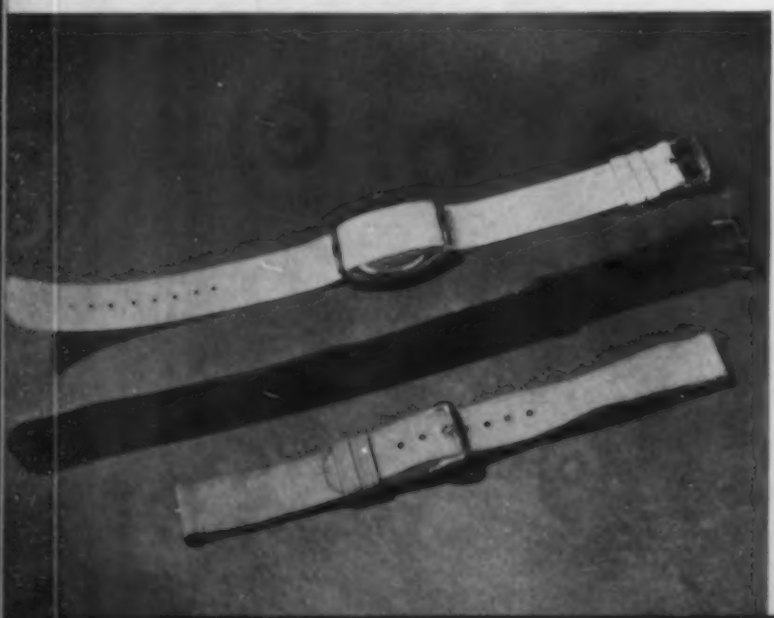
Durable, easy-to-clean card file guides are made of transparent amber Koppers cellulose acetate. The all-in-one-piece guides, with horizontal fluting for extra strength, were designed by Charles E. Jones & Associates, 189 W. Madison St., Chicago, for Rockwell-Barnes Co., 35 E. Wacker Drive, Chicago. Plastex Corp., 402 Mount Vernon Ave., Columbus 3, Ohio, extrudes these acetate guides

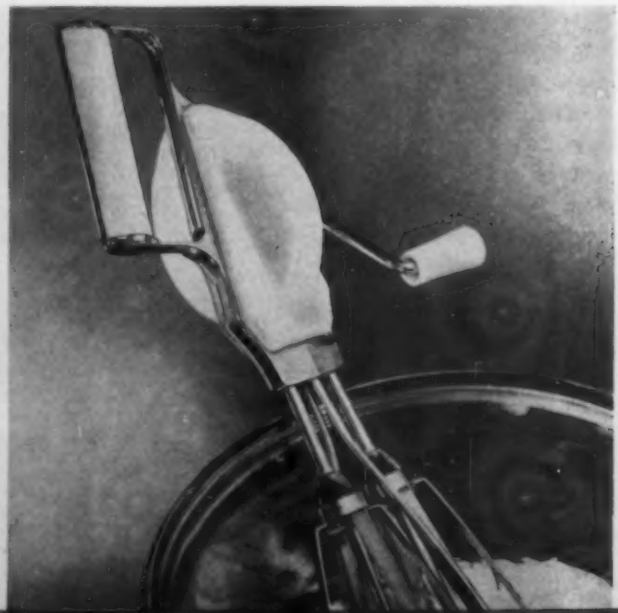


The handle of the new Pexto try-square is injection molded of Koppers ethyl cellulose. The colorful plastic handle, molded in two halves, is light in weight, tougher than hard wood, requires a minimum of finishing and is ideally adapted to rivet assembly. It also has excellent dimensional stability. These Pexto tools are manufactured by Peck, Stow, & Wilcox, Southington, Conn.

One-piece and two-piece watch straps made of woven nylon are more durable than leather, are unaffected by perspiration, which weakens most fibers and leathers. Nylon molding powder is used to seal the loose ends, to weld the folded ends, and to form eyelets for the buckles. Pla-Safe Plastics Corp., 1807 Elmwood, Buffalo 7, N. Y., makes the straps for Elgin National Watch Co., Elgin, Ill.

In the new Maynard Speed Mixer, the cleaning problem is simplified by housing the gears in plastic, thus preventing food particles from getting into hard-to-reach corners. Gear cover, gripping handle, and mixing handle are molded of Tenite II cellulose acetate butyrate by Coast Craft Industries, Glendale, Calif., for Maynard Mfg. Co., 1536 E. Colorado Blvd., Glendale, Calif.





PLASTICS PRODUCTS

The Marbl-matic, molded of transparent Koppers polystyrene, enables a boy to carry 35 marbles conveniently attached to his belt. The marbles cannot spill out, but a swastika-shaped wheel dispenses the marbles one at a time. Molded by Plastic Processing Co., 2210 S. Dort Hwy., Flint 1, Mich., for Living Designs, Grand Blanc, Mich.

High heat resistant Lustrex polysytrene is used for the bowl, handles, and plunger of the Home Donut Maker, a new kitchen tool which simplifies doughnut making. With batter in the bowl, it is only necessary to push and pull on the plunger to eject enough dough in the right shape. Made by Eject Donut Co., 186 Fifth Ave., New York 10

The value of a map in a schoolroom is greatly increased when a teacher can mark it up to emphasize her points. Markings on this map can be wiped off easily with soap and water because the map is laminated with Bakelite phenolic resins and protected with a melamine impregnated surface sheet. Laminating done by Paramold Research Laboratories, Inc., 260 Ludlow Ave., Springfield 31, Ohio

delivery?

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This wall socket hobbed cavity by Midland incorporates two narrow "T" projections raised 3/16 inches above the cavity surface. By using hobbed cavities of this type in place of the conventional insert cavities, all unsightly parting lines were eliminated and in addition to improving appearance, the hobbing was accomplished at only a fraction of the cost of cavity duplication by machining methods.

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One-Piece Molded Battery Case

Modifications on 525-ton two-ram transfer press permit production of 9½-lb. polystyrene case in one shot, using "canned material" process

ONE of the newer and more outstanding industrial plastics applications is a 9½-lb. polystyrene storage battery case (Fig. 1) being molded in one piece by Stokes Molded Products, Inc., Trenton, N. J. This case is being used by the Electric Storage Battery Co., Philadelphia, Pa., in constructing a storage battery designed by the Air Corps for use on the Lockheed P-80 airplane and later applied to jet fighter planes produced by Republic. Three years ago, when this battery was first designed, there were no injection machines capable of molding 9½ lb. of thermoplastic material in one shot and the original specifications called for a "two-piece" case.

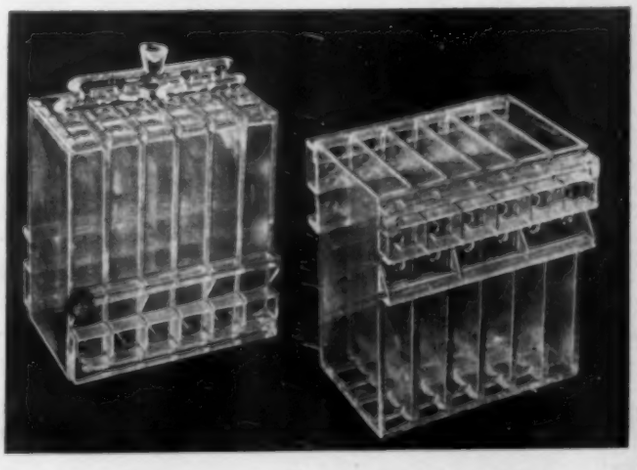
Stokes recently added an immense 525-ton two-ram transfer press to its line of equipment. This press, built by the Clearing Machine Co., was originally designed to produce a battery case of phenolic by a "canned material" transfer process. Briefly, this method of molding required that one "shot" of material be placed in a round tin can, sealed, and then heated to flowing temperature in an oven. The heated can of material was then placed in a transfer pot, slightly larger in diameter than the can. With the mold closed, the transfer ram exerted pressure on the flat bottom of the can, causing the top of the can to burst. As the transfer ram continued to ascend, the can collapsed in accordion fashion and the softened plastic material was transferred into the mold. The collapsed can was then treated in the same manner as a "cull" in an integral type transfer pot.

After a few refinements and changes were made in the press and technique, Stokes began producing the 9½-lb. polystyrene battery case in one piece on this press. The completed battery weighs 75 lb., is a 12-volt unit, and when installed in a plane in duplicate can provide 15 hp. for 3 minutes. The use of plastics was dictated by: 1) the requirement for positive cementing to provide non-spill and leak-proof construction for aerobatic design; 2) ability to stand higher temperature than rubber; and 3) lighter weight.

The power-weight ratio of this battery is greater than any designed heretofore. The requirement for gas venting is met by the design, yet the battery is so constructed that the acid cannot leak or spill no matter what position the battery is in. These battery features are mandatory for all planes which must be equipped to engage in acrobatic flying, as in the case of military fighter planes.

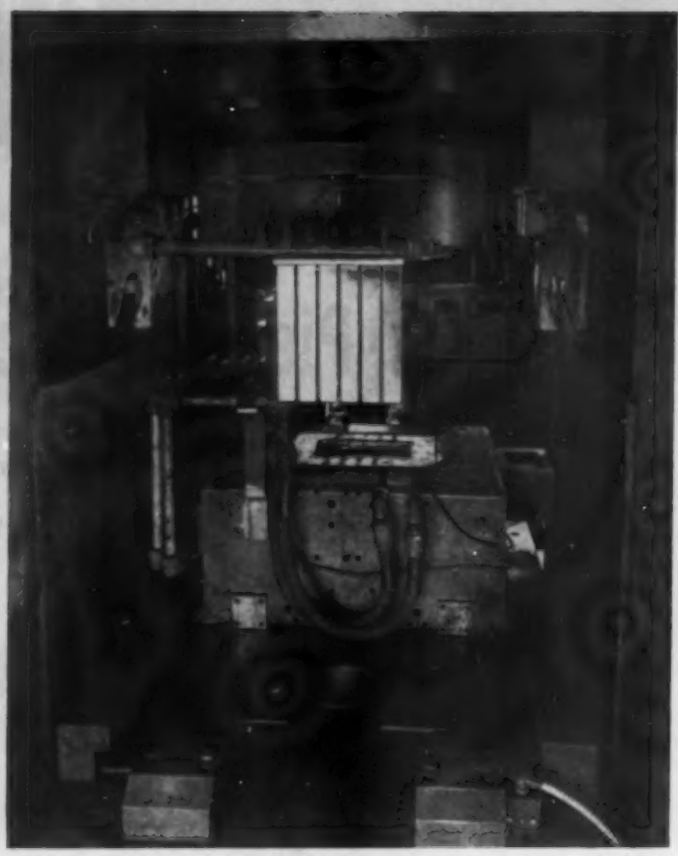
According to Republic Aviation Corp., the function of this battery on its F-84 is purely for stand-by and emergency use. The starter-generator accessory operated by the engine feeds the system when the engine is operating above 3000 r.p.m. Below this point, and during peak loads, the battery provides energy for operation of gun and armament mechanism; for activation of flight instruments including gyros, etc.; for the operation of servo elec-

1—Left: Battery case as it comes from mold with sprue still attached to bottom. Right: Case with sprue removed



*Reg. U. S. Patent Office.

2 — Large triangular casting (upper center) is mold clamp. Control panel at left of operator initiates all functions of press



3 — Before molding operation can begin, force plug is raised and cavity and chase retracted, in order to expose material chamber in bed of press

tric motors, fire warning system, pilot's canopy, radio equipment, landing and navigation lights, and electric motors of the plane's control system. The battery is capable of starting the Thunderjet's J-35 engine in emergencies and has powered more than seven successive starts without recharging.

Features of molding press

In order to make clear the manner in which this large battery housing is molded, a brief description of the main operating features of the mammoth molding press is in order. Because of the many operating features of this press, all functions are completely electrically interlocked so that the operator cannot cause any damage to any portion of the press or the mold by inadvertently pushing the wrong control button.

In order to keep the over-all height of this press within a reasonable dimension, it was necessary to design a rather novel type of mold clamp, the over-all vertical motion of which is no more than an inch or so. A large triangular casting seen in the upper center of Fig. 2 is mounted on a set of horizontal rails and when in the clamping position is directly between the overhead clamping ram and the upper die shoe. In operation, the clamping ram is raised slightly, thereby removing pressure from the heavy casting. A horizontal operating hydraulic ram then

5 — Cavity assembly is next hydraulically pushed back to molding position, thereby placing the sprue hole directly above center of can

4 — Enough thermoplastic material for one shot is heated to molding temperature in sealed tin can, then loaded into injection chamber

moves this casting horizontally back from the front of the press until it is completely out of the way of the upper die shoe. Removing this casting leaves ample room between the top of the upper die shoe and the head of the press so that the mold can be completely opened. In order to open the mold, separate hydraulic rams, coupled to the upper die shoe, carry it upward until the force plug is completely clear of the cavity.

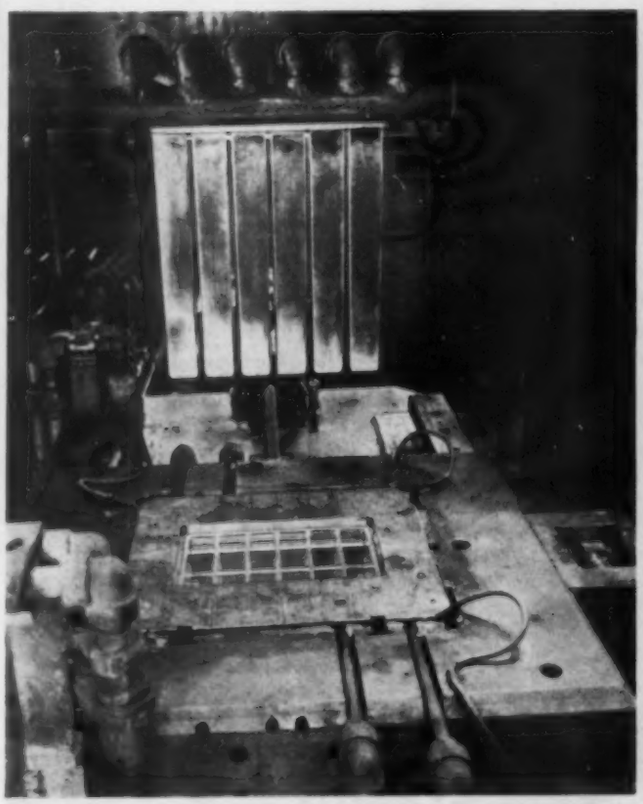
Another interesting feature of this press is that the cavity or lower section of the mold is also mounted on a set of horizontal traveling rails. When the proper control is operated, the cavity also is pulled backwards until it completely clears the bed of the press.

Figure 3 shows the press with force plug raised and the cavity retracted. In the lower center of the picture can be seen a chamber in which is loaded the can, 6½ in. in diameter by 12 in. high, of preheated thermoplastic material.

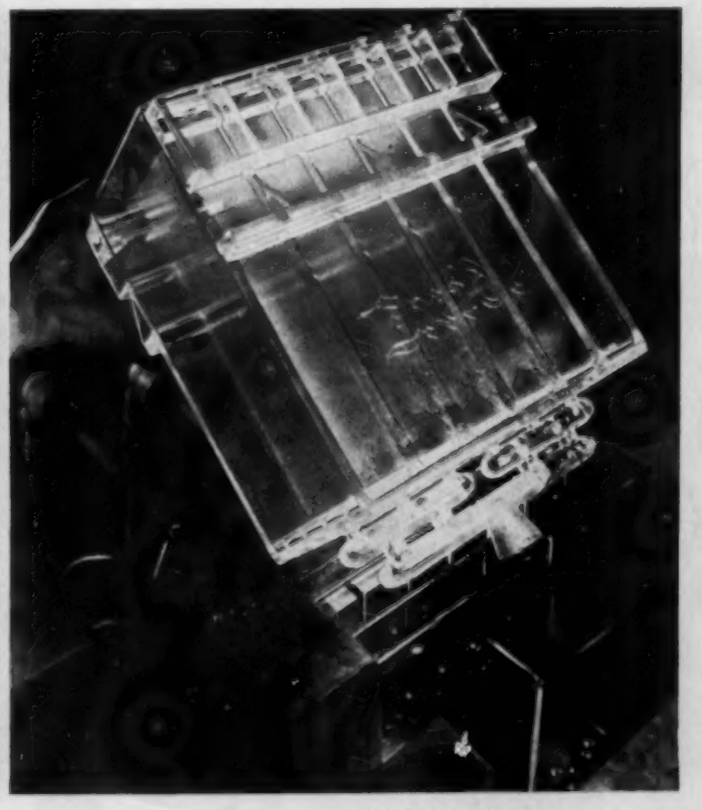
Figure 4 shows the operator loading the hot can of material into the transfer chamber. The can will drop down into the hole until it contacts the upper surface of the injection plunger. The sprue cap, a circular cap the size of the injection chamber with a central hole for flow of the plastic, is then placed over the top of the can and the cavity assembly is brought back into the molding position with a specially shaped nozzle directly over the top of the can.

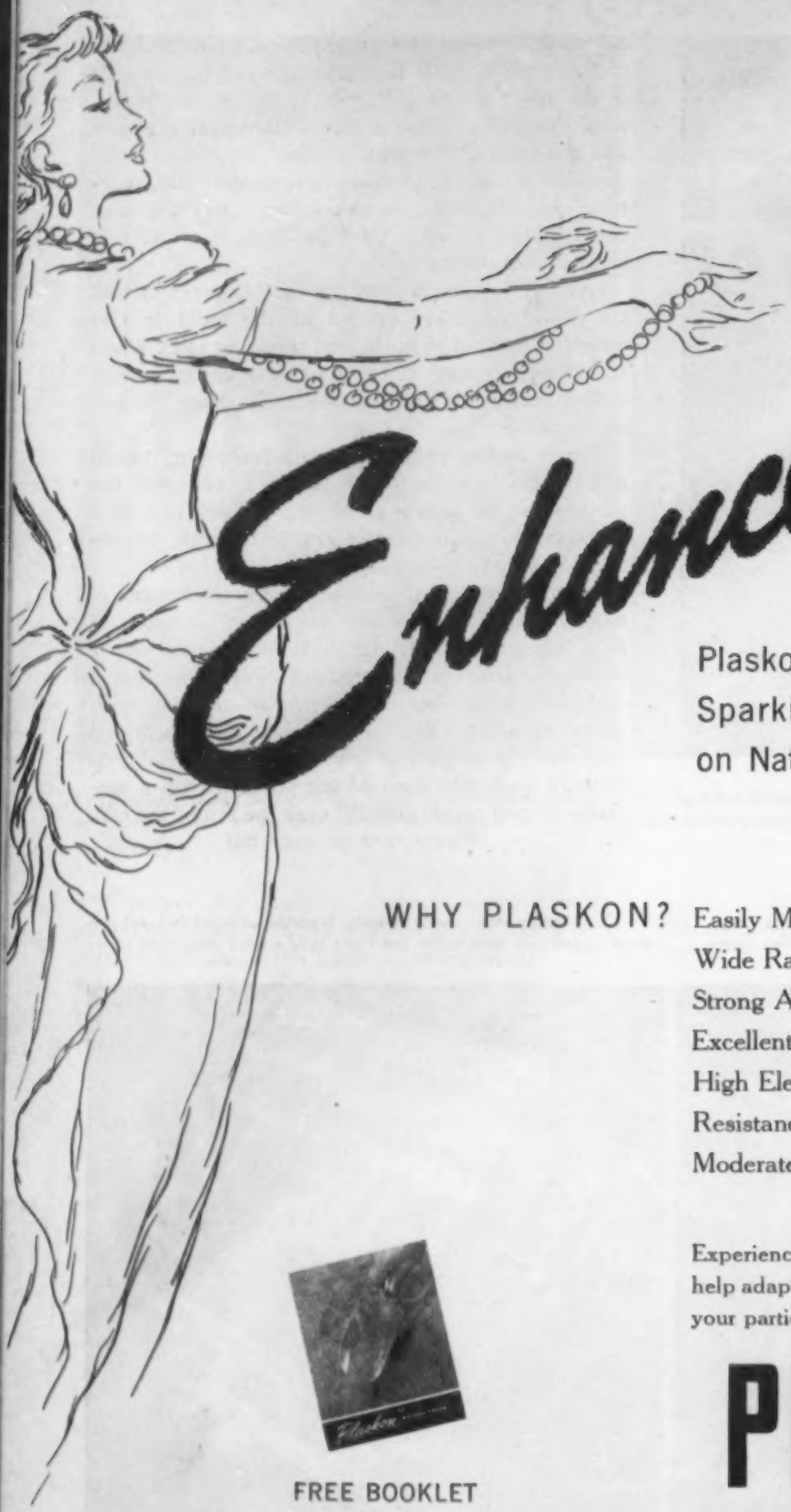
(*Please turn to page* 86)

6 — After time has elapsed for injection and cooling, force plug is raised and cavity assembly is moved to unloading frame



7 — On unloading frame, cavity assembly is positioned over knock-out pins which spread split mold halves apart and raise molded piece from cavity





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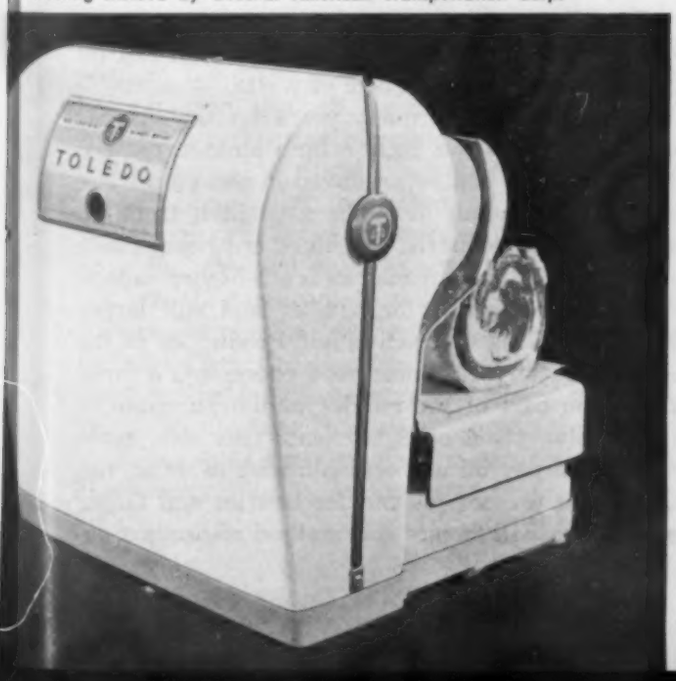

Figure 5 shows the cavity in molding position, with the force plug about to be lowered. After the mold has been closed, the triangular casting previously discussed travels to the clamping position on the top of the upper die shoe and the overhead ram then clamps the entire assembly into one fixed unit by pressing on the top of this casting. The total clamping pressure used for this job is 525 tons.

At this point in the cycle, the operator presses the button controlling the injection piston. Hydraulic power up to 2000 p.s.i. causes the injection ram to collapse the tin can, burst the top, and inject the heated thermoplastic material through the sprue, then through four gates into two separate large runners, and finally into six separate gates connecting directly to the bottom of the battery case. The injected material is then allowed to set for 5 min., after which the clamp is retracted, the force plug is raised (Fig. 6), and the cavity plate assembly forced from the bed of the press to the unloading frame.

In the operation of moving the cavity assembly to the rear of the press, the sprue is broken off, as can be seen in Fig. 7. After the sprue is broken, the collapsed can and remaining cull of polystyrene are left in the injection chamber. As soon as the cavity assembly has retracted, the can and cull are forced upward out of the hole by the injection plunger and discarded.

Underneath the unloading frame is an additional upward acting hydraulic jack equipped with knock-out pins which mate with holes in the cavity chase. As these pins are forced upward through the holes in the chase, they contact the bottom of the split mold. Continuing upward, the pins force the splits up and partially out of the chase. The splits are so designed that as they are forced out of the chase they also separate, thereby releasing the undercut sections of the battery case. Figure 7 shows the operator removing a completed case from the open split mold.

Figure 8 is an interesting view of the inside of the empty cavity, in the bottom of which can be seen three of the six large round gates which are required to properly fill out this 9½-lb. battery case.

8 — Three of six sprue holes can be seen in bottom of mold, lower center. All six are reflected in polished side of mold

Cored for water circulation

One of the interesting features in this molding operation from an engineering standpoint is the fact that each of the six segments of the force plug, clearly seen in Figs. 5 and 6, are cored for circulating media, in this case water. The cavity is also cored for the same media and, as seen in Fig. 3, these cores are connected with the main source of circulating media by means of armored flexible hose.

Mr. E. Laning, project engineer of Stokes, states that probably the most important point in connection with running satisfactory pieces in this job is the exact and constant temperature control of the mold. When the original experimental work was going on, attempts were made to produce good pieces by alternately heating the mold before injection and chilling it after. It was not until this heating and chilling method of molding was discarded in favor of the constant temperature procedure that satisfactory pieces could be produced on a continuous basis.

In a test run over several hours the average total cycle was 8 minutes. What makes this total lapsed time more spectacular is that there was only one operator on the job. It might be thought that this method of using and discarding a tin can plus the cull of polystyrene is a rather expensive method of molding. On the contrary, a throw-away of 4 oz. of polystyrene in the cull for a 9½-lb. box is not by any means a large percentage of waste.

It has taken a good many years for the plastics industry to reach the point where storage battery cases of this size can be produced in one piece. The present development indicates a positive trend in the size of molded parts. Machines are being made bigger; even as these machines reach higher capacities, the requirements for heavier and still larger pieces are making themselves felt. Production of the one-piece battery case described represents a large risk on the part of the molder in the purchase of an expensive piece of equipment. This risk, however, should pay off and will continue to do so, not only for the present job but for heavier and larger pieces which will fit into this method of production.

Metallizing Non-metallics

by JOHN DELMONTE*

DECORATIVE thin metal films; gold and silver plated buttons and costume jewelry employing plastic bases; non-metallic molds; electronic circuit components; and reflective surfaces suitable for mirrors, are some of the results obtained by metallizing plastic products. The methods of producing such metallized surfaces may be classified in accordance with methods for first obtaining an electrically conductive surface. Once this state has been attained, the usual plating procedures for copper, nickel, chromium, silver, gold, brass, etc., may be applied. The initial methods of procedure fall into the following categories:

1) Chemical deposition of metallic films,
2) Adhesive films, metallic and graphitic powders,
3) Vacuum evaporation of metals,
4) Cathode sputtering,
5) Metal spraying.

Chemical deposition

The chemical deposition of metallic films is especially suitable for molded and cast plastics items which have fine surface details. The plastics industry can profitably borrow from experiences gained in silvering mirrors, which have been carefully detailed in a Bureau of Standards publication (1). Absolute cleanliness of surfaces is necessary, and while degreasing solvents followed by nitric acid may be suitable for glass and glazed ceramic products, warm, mild alkaline solutions, brushing, and thorough rinsing are desirable for most plastics.

The silvering process for plastics is started by first cleaning the plastics piece, then immersing in a 5 to 10% stannous chloride solution and, finally, careful rinsing. The stannous chloride step is regarded as an essential feature in some of the "secret processes" used in the trade. Improved and heavier deposits are obtained through its use. Full directions for preparing and using silvering solutions are given in the Bureau of Standards publication (1). Other methods have been described by Wein (2). The writer has used these processes in the laboratory on phenolic, urea, polystyrene, acrylic, and acetate.

Chemical deposition of thin silver films upon the surfaces of plastics has been the most widely used technique for rendering the surface electrically conductive. There have been recent efforts to improve upon the stannous chloride solution which appears so desirable as a pre-treatment. Alcoholic solutions of stannous chloride are suggested rather than aqueous solutions in one process (3). Another sensitizing solution for plastics is prepared from 15 to 20 grams of stannous fluoborate, 250 ml. of 42% fluoboric acid, and 1 liter of water (4). Silicon tetrachloride and titanium tetrachloride have been employed also as pre-treatments on plastics surfaces, prior to application of the silvering solution (5).

The procedure for silvering plastics is altered in another process, where the silvering and reducing solutions are kept separated at all times. In this example, the silver nitrate is applied to the surface from a solution in acetone and alcohol, dried, and then immersed in an aqueous reducing solution of sodium hydrosulfite (6). Considerable interest was displayed in a bath for producing a conductive nickel film by the chemical reduction of nickel salts with hypophosphites in a hot ammoniacal solution. Developed at the Bureau of Standards, there are several modifications employing nickel chloride, sodium hypophosphite, ammonium chloride and sodium citrate at a pH of 8 to 9 (7). Deposits of nickel or cobalt are also obtained on plastics in a short time by sodium hypophosphite solutions of the salts and hydrazine, catalyzed by platinum. Firm, good adhering conductive films are claimed (8).

A copper reduction process has been developed for plastics. The surfaces are cleaned thoroughly and then sensitized with titanium sulfate. This is followed by treatment with a dilute solution of chloroplatinic acid. The copper film is formed by reduction of Fehling's solution, using a specially prepared metal-organic derivative of sodium hydrosulfite. The copper film commences to form in 4 or 5 min., and better and thicker film than obtained by silvering processes is claimed (9).

A novel, yet entirely practical method of coating paper and thin plastic films continuously is made possible by the chemical decomposition of metallic carbonyls. Surfaces are heated at 400° F. and exposed to carbonyls of nickel, iron, chromium, or molybdenum decomposed by high temperatures into metallic film and carbon monoxide (10).

Adhesive films and metallic powders

Simpler to use on plastic surfaces than the chemical reducing baths, are adhesive films containing a high percentage of metallic powders. One of the most successful of these has been lacquer films containing finely powdered silver, developed for printing electrical circuits upon plastics and ceramics.

(*Please turn to page* 90)

*Technical director, Plastics Industries Technical Institute.

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Printed electronic circuits were introduced into mass production early in 1945 in the tiny radio proximity fuzes for mortar shells. Radios, hearing aids, television sets, and a number of electronic measuring and controlled devices, have found use for the methods developed for establishing electrically conductive strips on non-metallic surfaces. Considerable work has gone into the preparation of conductor paint formulas. Outlined in a government publication are recommendations that plastics be treated with a formula containing 70% finely divided silver; 20% cellulosic ester or methacrylate resin; and 10% solvent, and then processed at 25 to 75° C. after application (11). Mechanical roughening of very smooth plastic surfaces as by sand blasting is suggested, followed by careful cleaning and rinsing. While stencils have been widely used, printing press processes have been used to reproduce spiral loop antennas on the internal surface of radio cabinets, a procedure which would lend itself to decorative effects, if required. Metaplast Co., New York, N. Y., long active in chemical reduction of silver films, has also issued recommendations on the silver content of conductive paints: 50% for brushing; 35% for spraying; and 60% for stencilling.

For many years, bronzing and metal electroplating of small non-metallic art objects and baby shoes has been made possible by the use of finely divided copper or brass powders, generally applied with lacquer or wax binder. Sufficient metallic powders are included so that, on polishing, the powders are burnished together. The chief purpose is to establish a conductive surface which lends itself to producing more substantial coatings by electro-deposition. Certain of the colloidal graphites are offered in a liquid suspension for application to surfaces to obtain good electrical conductivity.

In all of these applied films and metal powders, a much thicker coating is obtained than by chemical deposition, and in consequence, fine surface details on the surface may be obscured. Hence care should be exercised to design plastics objects with more pronounced surface detail if they are to be treated with adhesive films and metallic powders.

Vacuum evaporation

Development of high vacuum methods make possible the successful metallizing of plastics parts. Initially used in the preparation of reflective aluminum or silver surfaces on glass, applications have extended to many optical elements and components for electrical circuits. Evaporated metal films on thin plastics and paper films permit the manufacture of high capacity condensers for small spaces. The metal coatings obtained are more reflective and brilliant than those from adhesive films and metal powders, and in consequence the evaporated film techniques are amenable for augmenting designs on molded plastic nameplates and escutcheons.

Benner describes apparatus and equipment used in the metal coating of plastics by vacuum evaporation (12). The pumping system must be capable of evacuating the system to a pressure of 10^{-4} to 10^{-5} mm. of mercury.

Details on the vacuum evaporation technique for many other metals, including magnesium, titanium, manganese, vanadium, columbium, and others, are outlined in a recent group of patents (13). The work is generally mounted in the evacuating chamber at a distance of 12 to 24 in. from the filament. Metallizing plastics in this manner presents problems due to the volatilization of plasticizers. Excellent adhesion of the evaporated metal is obtained on acrylics, nylon, polystyrene, and some phenolics.

Cathode sputtering

Also conducted in vacuum, metals are transferred to plastics surfaces by spacing them between a cathode and anode and applying a high voltage (1). This method has been successfully used in the application of special metal films upon small objects. However, it is not as convenient or as widely applied as other methods described above.

Metal spraying

Metal spraying upon plastics surfaces is entirely feasible though the appearance of the metal film is not as pleasing as that obtained by other methods, tending to be more rough and uneven. However, films are much thicker and more durable than the evaporated or chemically deposited films. Techniques of metal spraying have been developed for interior shielding or printing of electrical circuits through a stencil.

Applications

In the discussion of individual processes, some of the applications of metallized plastics have been mentioned. They may be grouped in the following categories:

A) Decorative. The highly reflective, brilliant films of aluminum and silver will augment many colorful plastics, offering greater design and sales appeal.

B) Optical. Thin films of metal on transparent plastic will permit light transmission as well as light reflection, a combination most desirable for some optical goods.

C) Electrical. Chief industrial reasons for metallic films upon plastics arise from the electrical industry. Employing the excellent electrical insulating plastics as bases, metallic films may be used as shields for radio frequencies; in manufacture of capacitors; as printed circuit elements; as means

(*Please turn to page* 140)

Telex Twinset manufactured by Telex, Inc., Minneapolis, Minn. Tulox tubing used for headband extruded of Tenite by Extruded Plastics, Inc., Norwalk, Conn.

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THIS earphone headset, designed to eliminate annoying pressure on the ears, features twin Tenite-encased receivers which rest lightly at the temples. Sound is piped into the ears via adjustable metal arms tipped with Tenite. Connecting headband runs through a slender, flexible length of extruded Tenite tubing.

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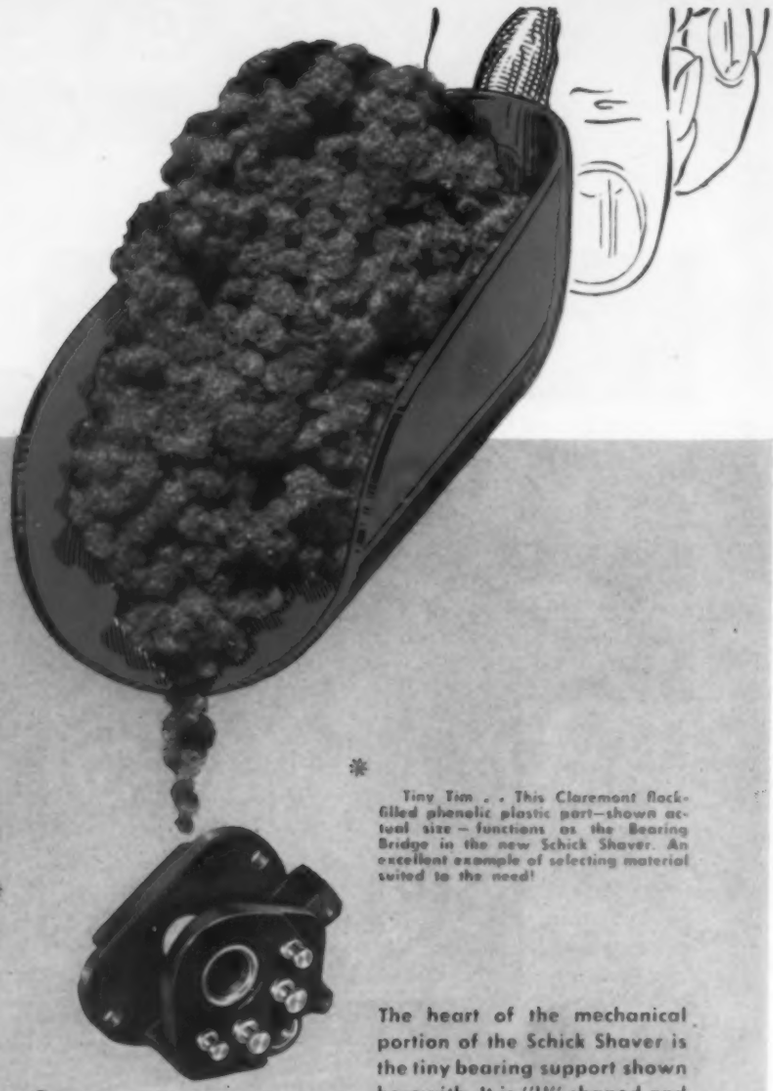

Thanks to CLAREMONT Flock this Tiny Tim* has the muscles of a giant

* Tiny Tim . . This Claremont flock-filled phenolic plastic part—shown actual size—functions as the Bearing Bridge in the new Schick Shaver. An excellent example of selecting material suited to the need!

The heart of the mechanical portion of the Schick Shaver is the tiny bearing support shown herewith. It is "U" shaped and incorporates seven accurately positioned, molded-in metal inserts. The part's importance, and insulative specifications called for extreme care in material selection.

All requirements were fulfilled through the use of a **Durez** impact phenolic, fortified throughout by the muscle-giving strength of Claremont Cotton Flock! The part, though but a mite in size, proved mighty in terms of perfection performance.

Claremont Cotton Fillers provide the pattern and structure for stronger plastics. You don't see them in the finished products—they're the internal elements—their presence is one of function; they enable plastics to take on tougher and tougher end-use assignments. Complete details and laboratory testing samples of the four types of Claremont Cotton Fillers (flock, thread, fabric, cord) are available upon request. Inquiries invited!

CREDITS

The above pictured black phenolic Bearing Bridge of the new Schick "400" Shaver is shown through the courtesy of and molded by Shaw Insulator Company of Irvington, New Jersey. Its "Samson" strength was made possible through the use of a Durez plastic formulated with a Claremont Cotton Flock filler.

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THE FILLER IS THE HEART

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"The Country's Largest Manufacturer of Flock" CLAREMONT, N. H.

Shear Impact and Shear Tensile Properties of Adhesives*

by IRVING SILVER†

Statistical analysis of shear impact data of adhesives employed to bond molded pulp-filled phenolic to brass indicates that when the thickness of the adhesive bond is held constant, the shear impact method is reproducible and reliable. This method can be employed to detect weaknesses in a joint which are not made apparent with the standard strip shear tensile test, particularly where the joint specimens have been exposed to heat or are tested at low temperatures, or when variations in the preparation (sanding) of phenolic surfaces are made. Comparisons are made of data on strength properties of air-dry solvent, resorcinol, and polysulfide adhesives, obtained by both the shear impact and shear tensile methods.

WITH the advent of high strength and fast curing adhesives in structural engineering, a more critical evaluation of the strength properties of these adhesives appears to be necessary. In the past considerable reliance has been placed on the shear tensile method as a means of evaluating adhesives for specific applications. Although the data obtained is informative, particularly on a comparative basis, it can not be accepted as sufficient, especially where the bonded joint may be subject to impact forces.

The shear impact method of A.S.T.M. Committee D-14 on Adhesives has been found to yield data which serves to form a more complete picture of the strength properties of a bonded joint. For example, in the bonding of pulp-filled phenolic to brass in ordnance equipment, shear tensile tests indicated that a vinyl butyral adhesive would be superior to that of a Buna N/vinyl adhesive. In simulated service tests, the reverse was found to be true. Further investigation with shear impact tests revealed that the Buna N/vinyl adhesive possessed the greater impact resistance, thus confirming the service tests.

Since in the above application the bond was required to withstand without failure high ramming speeds, it became apparent that a need for additional information on the behavior of bonded joints under shear impact and shear tensile forces existed. Accordingly, a study of the behavior of bonded joints under shear impact and shear tensile forces was initiated.

As no heat could be applied to the assembly during the bonding period, the study was limited to room temperature setting adhesives. The materials adhered were restricted to pulp-filled phenolic and commercial brass both of which are employed in the assembly of ordnance equipment.

Factors included in the study were the following:

Table I.—Statistical Analysis of Shear Impact Data[a, b]

Adhesive	*Adhesive thickness*	*Shear impact*	*Standard deviation*	*Standard error*	*Coefficient of variation*
	mils.	*ft.-lb.*	*ft.-lb.*	*ft.-lb.*	*%*
Buna N/vinyl	7.7±1.0	4.3	0.3	0.1	6.0
Thiokol	1.9±1.0	4.6	0.6	0.1	12.3
Resorcinol/primer	4.4±1.0[c]	7.0[d]	1.1	0.2	15.5

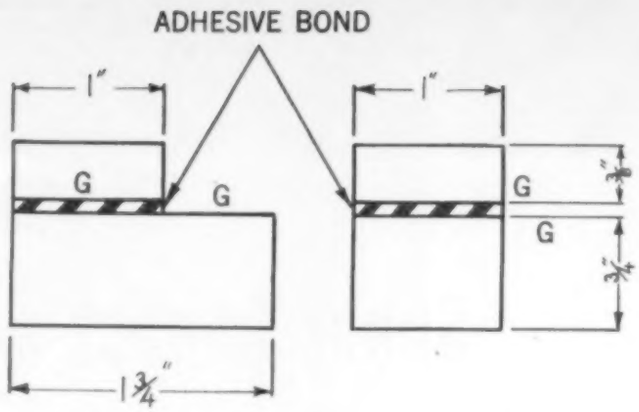
[a] Specimens tested after conditioning at 77° F. and 50% relative humidity for 7 days.
[b] All phenolic surfaces sanded.
[c] Refers to thickness of resorcinol; primer (rubber/casein latex) thickness ranged from 2 to 3 mils.
[d] Major failure of bond occurred in the phenolic.

*Presented at the Annual Meeting of the Society of Plastics Engineers in Philadelphia on Jan. 20, 1949.
† Naval Ordnance Laboratory, White Oak, Md.

Table II.—Effect of Adhesive Thickness on Shear Impact Strength[a, b]

Adhesive	*Primer*[c]	*Adhesive thickness*	*Shear impact*
		mils	*ft.-lb.*
Buna N/vinyl	....	1.1	1.6
		2.9	3.0
		4.4	3.7
		13.9	5.2
		18.2	8.2
		21.8	9.2
		34.5	10.3
Buna N/phenolic	....	1.0	2.6
		2.0	2.8
		4.0	4.1
		8.5	5.2
		25.0	8.9
		30.6	9.4
Vinyl butyral	....	1.3	0.7
		2.5	1.3
		15.7	4.1
		28.0	5.3
Thiokol	....	2.1	5.5
		4.7	7.0
		7.5	7.5
		14.5	10.3
		30.9	12.2
		46.0	15.9
Resorcinol	Rubber/casein latex	2.2	7.0
		5.0	6.0
		8.0	6.1
		17.8	5.7
		23.0	5.8
		33.0	6.8
Resorcinol	Buna N/vinyl	4.9	5.2
		14.2	5.2
		23.4	4.3
		34.8	3.9

[a] After the last coat of adhesive was laid down, the specimens were conditioned at 77° F. and 50% relative humidity for 7 days.
[b] All phenolic surfaces sanded.
[c] Primer thicknesses were kept constant.



1 — Block shear impact specimen, pulp-phenolic to metal

1) statistical analysis of shear impact data, 2) adhesive thickness and shear impact strength, 3) exposure to heat, 4) surface preparation (sanding) of phenolic specimens, 5) testing at —40 and +170° F., and 6) setting rates.

Methods and materials

Shear impact.—This test was adopted from the A.S.T.M. tentative method for block shear impact, D950-47T. The specimens (Fig. 1) consisted of pulp-filled phenolic, 1 by 1 by ⅛ in., bonded over an area of 1 sq. in. to commercial brass, 1¾ by 1 by ¾ inches. After bonding and subjection to selected experimental conditions, the specimens were tested in a Tinius-Olsen impact tester equipped with a special adapter to hold the specimens and a hammer which provided impact forces at a velocity of 11 ft./sec.

Shear tensile.—Shear tensile specimens consisted of commercial brass, 7 by 1 by ⅛ in., bonded over an area of 1 sq. in. to pulp-filled phenolic, 7 by 1 by ¼ in., to form a simple single overlap joint. After subjection to selected experimental conditions, the bonded specimens were tested to destruction in a Baldwin-Southwark universal testing machine (60,-

Table III.—Effect of Continuous Exposure to Heat at 140° F.[a]

Adhesive	*Vinyl butyral*	*Thiokol*	*Buna N/vinyl*	*Resorcinol*	*Resorcinol*	*Resorcinol*	*Resorcinol*
Primer	———	———	———	*Rubber-casein*	*Buna N/phenolic*	*Buna N/vinyl*	*Modified phenolic*
Shear impact							
28 days at 77° F., ft.-lb.	1.9	6.5	4.5	7.0	6.3	7.3	5.8
Failure[b]	FAB, FAPh	FA	FAB, FA	FPh	FAB, FPh	FPh	FPh, FPB
28 days at 140° F., ft.-lb.	1.7	4.6	5.1	0.2	1.9	3.4	4.8
Failure	FAB, FAPh	FA	FAB, FAPh	FPB	FPB	FPB	FPh, FPB
Shear tensile							
28 days at 77° F., p.s.i.	376	42	90	826	592	1034	1130
Failure	FAPh	FA	FAB	FPh, FPB	FPB	FPA, FPh	FPh, FPB
28 days at 140° F., p.s.i.	943	205	711	929	993	995	1026
Failure	FAPh, FPh	FA	FAB, FAPh	FPh, FPB	FPB, FPh	FPB	FPh, FPB

[a] All phenolic surfaces sanded.
[b] Code for failure: FA = failure in adhesive; FAB = failure of adhesive to brass; FAPh = failure of adhesive to phenolic; FAP = failure of adhesive to primer; FPB = failure of primer to brass; FPh = failure in phenolic; FP = failure in ...m

Table IV.—Surface Preparation of Phenolic Specimens

Adhesive	*Vinyl butyral*	*Thiokol*	*Buna N/vinyl*	*Resorcinol*	*Resorcinol*
Primer	——	——	——	*Rubber/casein*	*Neoprene/ phenolic*
Shear impact[a]					
Phenolic sanded, ft.-lb.	2.9	7.5	3.7	7.4	6.8
Failure[c]	FAPh	FA	FAPh	FPh	FPh
Phenolic unsanded, ft-lb.	2.4	6.6	2.5	0.3	2.9
Failure	FAPh	FA, FAPh	FAPh	FAPh	FAPh
Shear Tensile[b]					
Phenolic sanded, p.s.i.	376	42	90	826	777
Failure	FAPh	FA	FAB	FPh	FPh
Phenolic unsanded, p.s.i.	280	91	81	617	647
Failure	FAPh	FAB	FAPh	FAPh	FAPh

[a] Specimens conditioned at 77° F. and 50% relative humidity for 7 days.
[b] Specimens conditioned at 77° F. and 50% relative humidity for 28 days.
[c] Code for failure: refer to Table III.

Table V.—Shear Impact and Tensile Tests at —40° F. and +170° F.[a, b]

Adhesive	*Thiokol*	*Buna N/vinyl*	*Resorcinol*	*Resorcinol*	*Resorcinol*
Primer	——	——	*Buna N/vinyl*	*Rubber/casein*	*Neoprene/ phenolic*
Shear impact					
At —40° F., ft-lb.	6.2	7.0	0.6	0.9	2.7
Failure[c]	FPh, FAB	FAPh	FPB	FPB	FPh, FPB
At 77° F., ft.-lb.	6.5	4.2	6.8	7.4	6.8
Failure	FA	FAPh	FPh	FPh	FAP
At 170° F., ft.-lb.	3.8	2.4	2.4	1.0	2.4
Failure	FA	FA	FP	FPB	FPB
Shear tensile					
At —40° F., p.s.i.	898	282	1085	610	1190
Failure	FA, FAPh	FA	FPh	FAPh, FPB	FPh
At 77° F., p.s.i.	91	55	558	899	869
Failure	FA	FA, FAPh	FPB	FPh	FPB, FAP
At 170°F., p.s.i.	21	6.3	43	167	270
Failure	FAB, FAPh	FA	FP	FPB	FPB

[a] After conditioning for 7 days at 77° F. and 50% relative humidity, specimens were maintained at either —40 or 170° F. for 2 hr. prior to testing.
[b] All phenolic surfaces sanded.
[c] Code for failure: refer to Table III.

Table VI.—Setting Rates of the Adhesives Studied[a, b]

Adhesive	*Vinyl butyral*	*Thiokol*	*Buna N/vinyl*	*Resorcinol*	*Resorcinol*	*Resorcinol*	*Resorcinol*
Primer	——	——	——	*Rubber/casein*	*Buna N/phenolic*	*Buna N/vinyl*	*Modified phenolic*
Shear impact							
7 days, ft.-lb.	1.1	6.2	3.2	7.4	7.2	6.8	5.4
28 days, ft.-lb.	1.9	6.5	4.5	7.0	6.3	7.3	5.8
Shear tensile							
3 days, p.s.i.	63	58	20	653	324	502	957
7 days, p.s.i.	98	91	55	899	422	558	985
28 days, p.s.i.	376	83	90	826	592	1034	1130

[a] All phenolic surfaces sanded.
[b] All specimens conditioned at 77° F. and 50% relative humidity.

000-lb. capacity) at a head travel speed of 0.05 in. per minute.

Adhesives.—The adhesives employed in this study were of three types and all set at room temperature (20 to 30° C.). The air-dry solvent adhesives attained their major strength through the evaporation of solvent. These adhesives included the following: Buna N/vinyl, Buna N/phenolic, and vinyl butyral.

The Thiokol adhesive was a thick paste but solventless and set upon the addition of a catalyst.

The resorcinol adhesive set upon the addition of a catalyst and was employed in conjunction with a primer applied to the brass. The primers set by the

(*Please turn to page* 136)

Bearing Strength Tests On Thermoplastics

by J. WRAY FOGWELL*

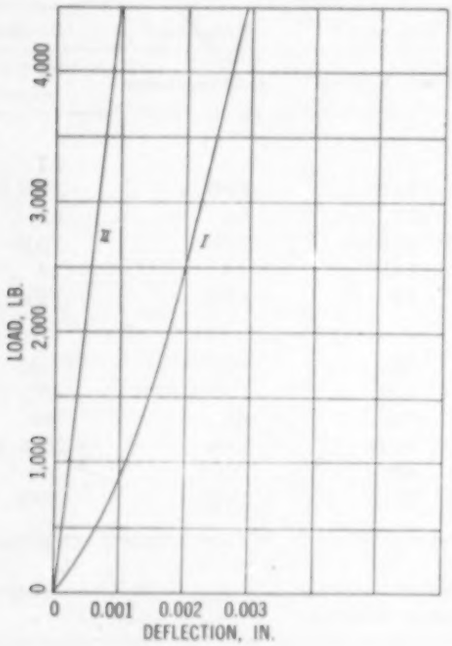
PLASTICS have been in use for many years but until recently relatively little attention has been paid to their mechanical properties with a view of using the plastic itself as a load-carrying member. With this new viewpoint, it became desirable to know such properties as tensile and compressive strengths, yield point, modulus of elasticity, etc., for the various plastics. Another property, useful in the design of bolt-, rivet-, or pin-connected joints, is the bearing strength of the plastic. Bearing strength, as used in this paper, is taken to mean the average stress in the plastic at which the deformation of the plastic is 0.2% of the diameter of the hole in which the bearing pin is inserted. The average stress is determined by dividing the load by the projected area of the pin.

Tests to determine the bearing strength of plastics were carried out at the University of Kansas in 1942.[1] These tests were made on thermosetting plastics and plywood, while the tests herein reported were made on thermoplastic materials. In both cases the materials tested were supplied by Dr. G. M. Kline of the National Bureau of Standards.

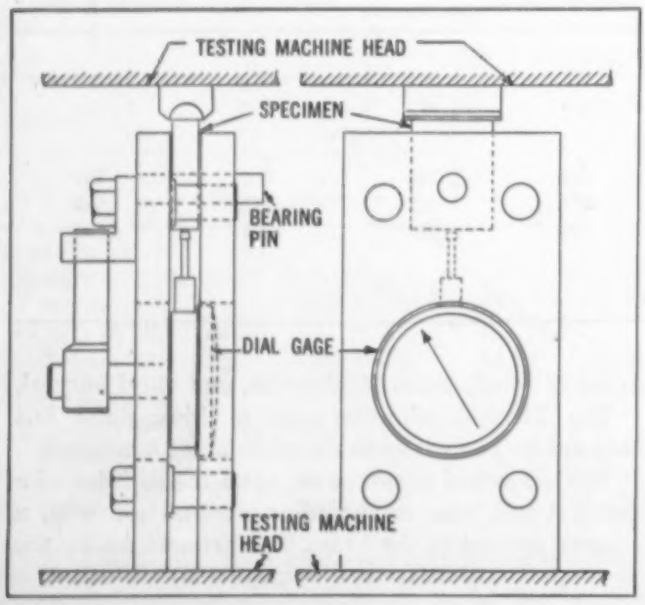
Aside from the materials tested, the main differences between these two sets of tests are in the size of bearing pin used, the size of specimen, and the method of measuring deflection. In the previous tests a ⅜-in. diameter bearing pin was used, while in the present tests a ½-in. diameter bearing pin was used. In both cases the width of the specimen was 3 times the pin diameter. The length of the specimen was 3⅓ times the pin diameter in the first tests and 4 times the pin diameter in the present tests. In both cases the specimens were tested full thickness ex-

*University of Kansas

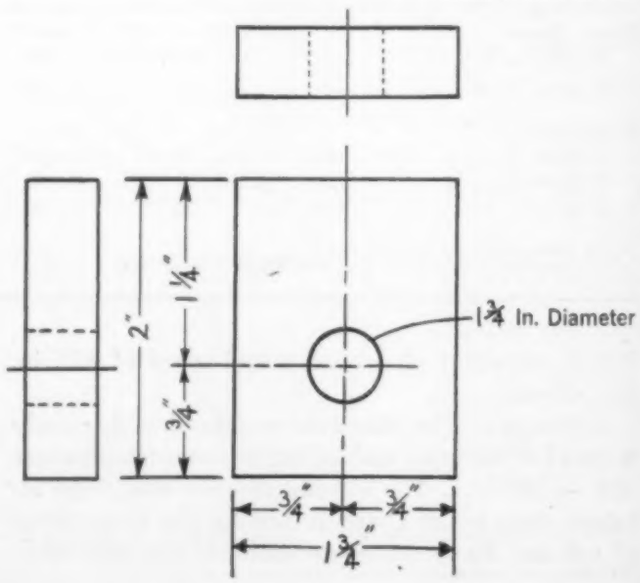
1 — Deflection of bearing pins under load. I = ⅜-in. diameter pin. II = ½-in. diameter pin



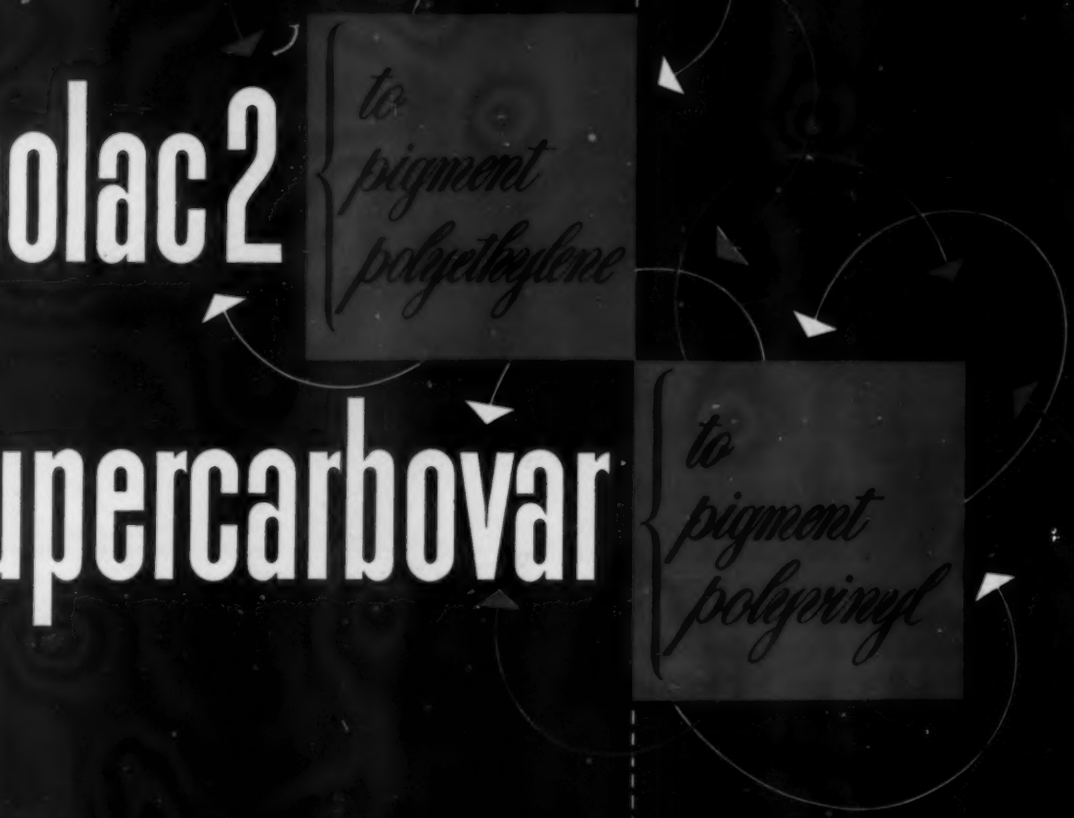
2 — Bearing test jig



3 — Bearing test specimen



1 "Bearing Strength of Plastics and Plywood", by James Bond, Trans. A.S.M.E. 65, 9 (Jan. 1943); MODERN PLASTICS 19, 70 (July 1942).



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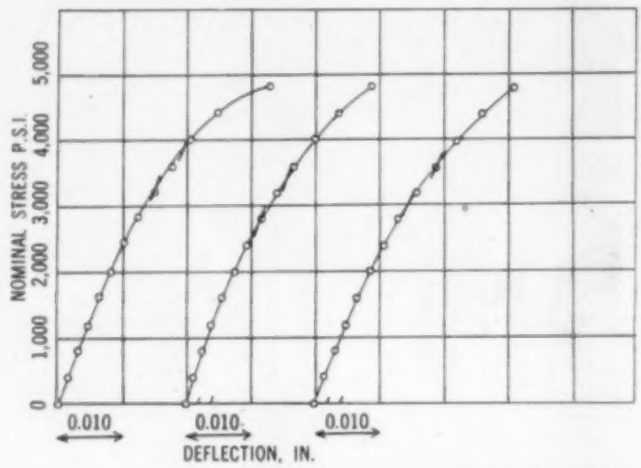
cept when the thickness exceeded ½ in., in which event the thickness was reduced to ½ inch.

In the previous tests the deflections of the specimens were measured by means of a dial gage connected to the lower side of the specimen by a lever to give a magnification of 10 to the deflection of the specimen. In this manner the deflection of the specimen could be read to 0.0001 in. with a dial gage graduated in 0.001-in. divisions. In the present tests, the dial gage was mounted directly below the centerline of the specimen so that the deflection of the specimen was measured directly. This method allowed the deflection to be measured only to 0.001 in., but any errors due to the levers previously used were eliminated.

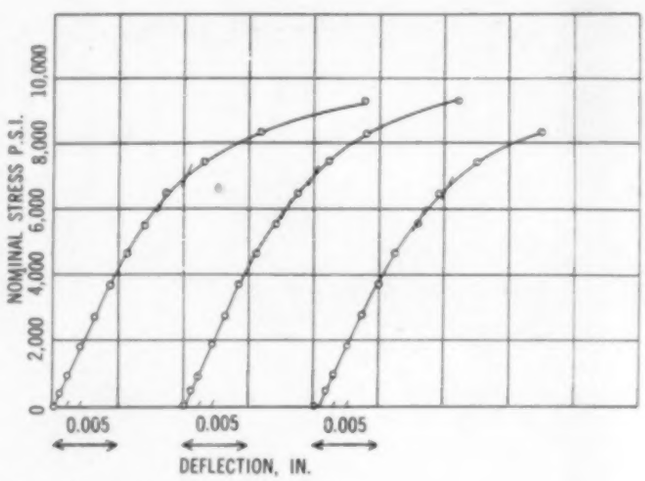
It was noted in the previous work that many of the specimens tested apparently yielded rapidly when load was first applied, indicating that this was either a characterstic of the material tested or that slack was being taken up in the testing jig. Since the latter reason seemed most likely, a test was made to determine the deflection of the bearing pin under load. This test was made by removing the lower part of a specimen and applying load to the top part, at the same time measuring the deflection of the pin in the same manner in which the deflection of the specimens had been measured. The results of this test are shown in Fig. 1, Curve I. The reason for the initial rapid deflection of the pin has not been determined, but the deflection indicated by the straight portion of the curve is thought to have been due to bending and shearing deformation of the pin. This initial rapid deflection of the pin may have been partially the cause for the apparent rapid initial yielding of the test specimens.

In order to overcome this difficulty in succeeding tests a new bearing test jig was designed and built as shown in Fig. 2. In this apparatus a ½-in. diameter pin was used in place of the ⅜-in. diameter pin used previously. In order to determine the deflection of the pin in this apparatus a test similar to the one for the first apparatus was made. The results of this test are shown in Fig. 1, Curve II. This curve shows that the initial rapid deflection of the pin was eliminated and that the deformation of the pin was reduced. However, the deformation of the pin was expected

(*Please turn to page* 138)

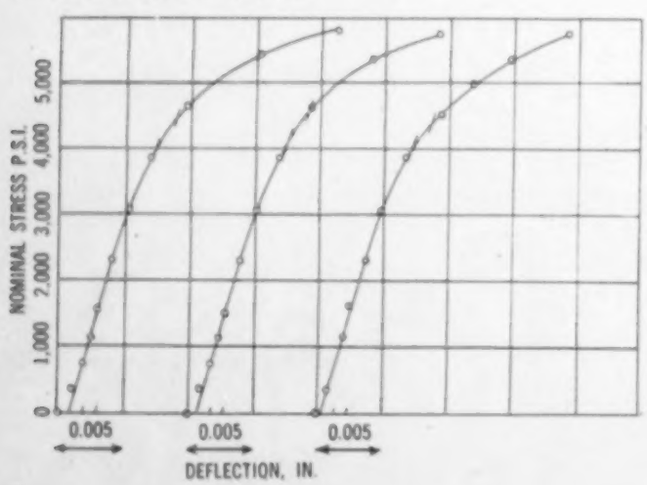


7 — Polyvinylidene chloride (BD-1)

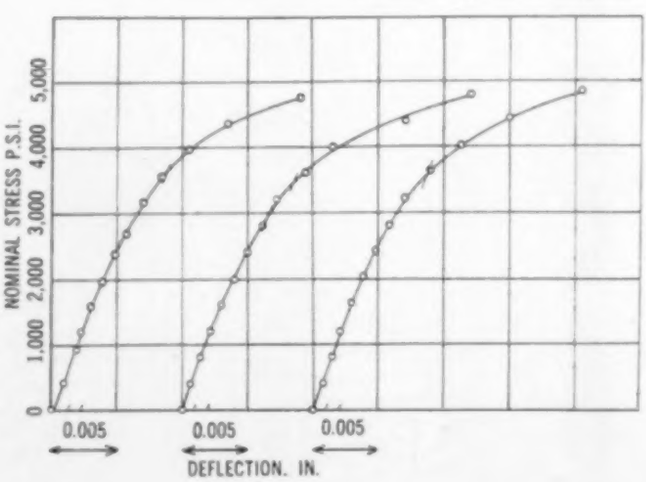


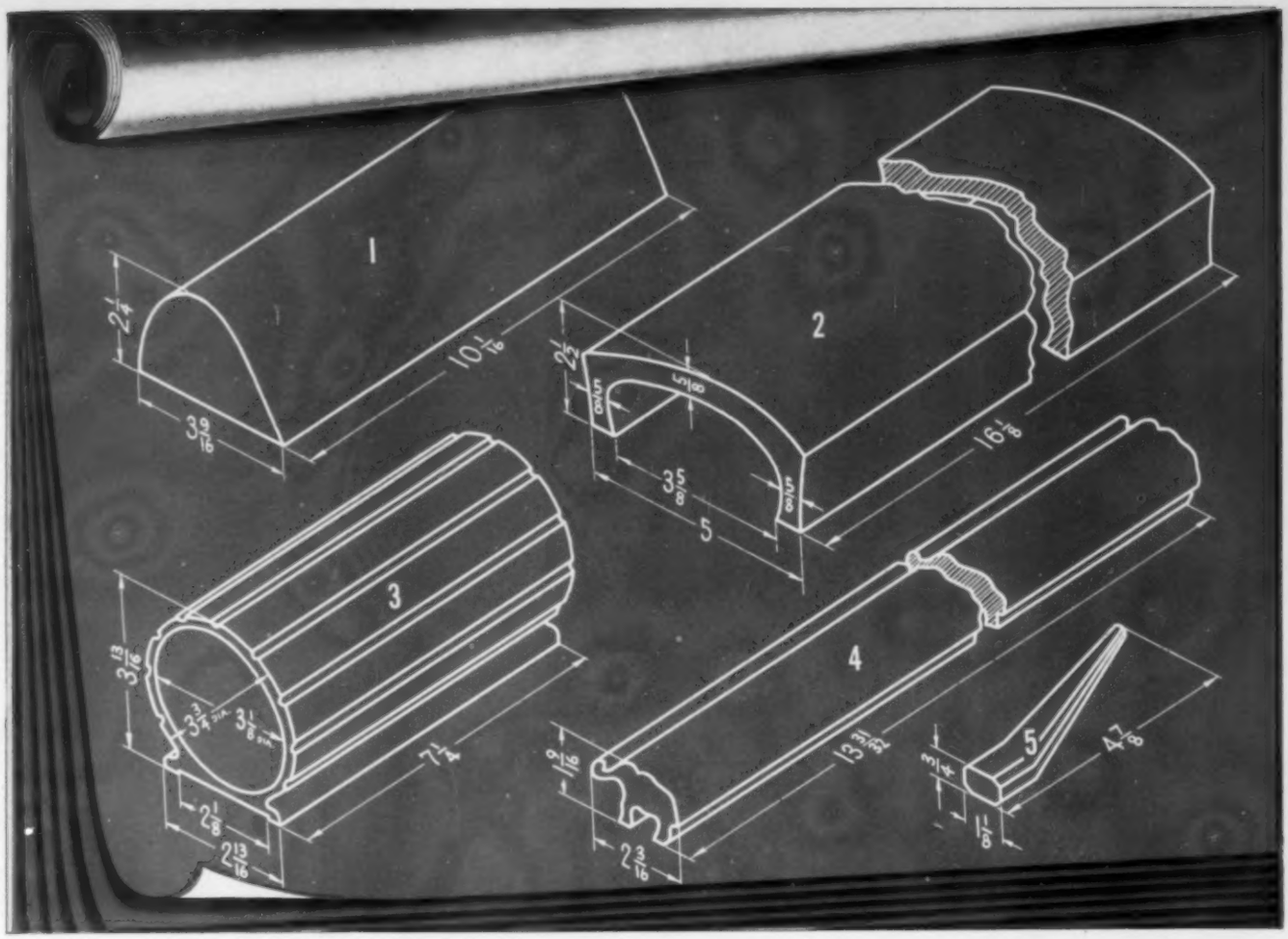
6 — Polymethyl methacrylate (K-8)

4 — Cellulose acetate (B-109-A)



5 — Ethyl cellulose (EX-5485)





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PLASTICS DIGEST*

Abstracts from the world's literature of interest to those who make or use plastics or plastics products. Send requests for periodicals to the publishers listed

Materials

INTERNALLY PLASTICIZED PHENOLIC RESINS. F. J. Hermann. Paint Tech. *13*, No. 147, 91-4 (1948). Phenolic resins are internally plasticized by making a copolymer of a phenol and a fatty acid which is then condensed with an aldehyde. The product is elastic and resistant to chemical reagents.

ARALDITE. C. J. Moss. British Plastics *20*, 521-7 (Nov. 1948). A new ethoxyline resin with excellent adhesion properties for metals, glass, ceramics, and most plastics is reported. Casting, potting, and coating ethoxyline resins are also described. This is a Swiss development. Properties and applications are discussed.

S-POLYMER FILMS. R. G. Newberg, J. R. Briggs, and W. A. Fairclough. Modern Packaging *22*, 151-9 (Nov. 1948). The properties of styrene-isobutylene thermoplastic copolymers in film form are presented. They can be used alone or with other plastics and elastomers. The gas and water vapor permeability of films of these materials are very low. Applications in food packaging are discussed.

FLAME-RESISTANT CELLULOSE ACETATE. C. Sundberg. Electrical Manufacturing *42*, 82-5, 182, 184, 186 (Sept. 1948). The properties and applications of "flame-resistant" cellulose acetate plastics are discussed. These materials have a heat distortion temperature of about 140° F. They are formulated by incorporating flame depressant nonvolatile modifiers in compositions of high-acetyl cellulose acetate plastics.

PREPARATION AND REACTIONS OF α, β-DICHLOROVINYLTRICHLOROSILANE. C. L. Agre. J. Am. Chem. Soc. *71*, 300-4 (Jan. 1949). Trichlorosilane and trichloroethylene react in a hot tube at 500° C. or in the presence of a peroxide catalyst to give α, β-dichlorovinyltrichlorosilane. This silane and related silanes synthesized from it hydrolyze to form resins which lose halogen on heating in air at 110° C. The resins are colorless and tough.

Coatings

CONTRIBUTIONS OF POLYMER CHEMISTRY TO THE PLASTICS AND COATING INDUSTRIES. C. S. Fuller. Ind. Eng. *41*, 259-66 (Feb. 1949). The contributions of polymer chemistry to the plastics and coating industries are reviewed and major technological developments are listed; 127 references.

PROGRESS IN THE PROTECTIVE COATINGS AND PLASTICS INDUSTRIES. D. H. Wheeler. Ind. Eng. Chem. *41*, 252-8 (Feb. 1949). Most protective coatings based on drying oils result from two basic reactions: 1) polymerization by heat (bodied oils) or condensation (alkyds, synthetic oils, certain resin-oil combinations); 2) further polymerization by oxygen, catalyzed by driers, light, or heat. This paper attempts to assign an average functionality to the unsaturated groups in drying oils as they function in heat and oxidative polymerization, and to review what the oil chemist has contributed to understanding the mechanisms by which they exert their functionality. There is a remarkable general similarity in the heat and oxidative functionality of the unsaturated groups of drying acids, and in the formation of conjugated from nonconjugated groups in both types of polymerization. However, there is evidence of considerable difference between the two types of polymerization as to the nature and extent of side reactions and possible structures involved in the polymerization.

INFLUENCE OF POLARITY ON ADHESION OF SURFACE COATINGS AND ORGANIC FINISHES. H. L. Rice. Org. Finishing *9*, No. 5, 24-6, 41 (1948). Materials of the same degree of polarity form stronger bonds with each other than materials of different degrees of polarity. Applications in coatings are discussed.

Molding and fabricating

EXTRUSION DEVELOPMENT. British Plastics *20*, 360 (Aug. 1948). A modified extrusion process which produces a transverse decorative effect is described. These effects are produced during the extrusion process; there is no embossing treatment used after the extrusion.

DIELECTRIC HEAT . . . WOOD-FABRICATION TOOL. T. P. Kinn and R. E. Kirby. Westinghouse Engineer *8*, 138-43 (Sept. 1948). The use of dielectric heating to cure resin adhesives used to fabricate products from wood is discussed.

Properties

REFRACTOMETRIC DETERMINATION OF SECOND-ORDER TRANSITION TEMPERATURE IN POLYMERS. III. ACRYLATES AND METHACRYLATES. R. H. Wiley and G. M. Brauer. J. Polymer Sci. *3*, 647-51 (Oct. 1948). A refractometric technique for determination of second-order transition temperature (T_m) of polymers has been extended to include a series of alkyl acrylate and methacrylate polymers with transitions at temperatures down to −50° C. A convenient technique for determining refractive index down to −75° C. is described. Certain long-chain alkyl polymers are birefringent below T_m. Correlations of brittle point with T_m and relations between viscosity and T_m are reported.

ADHESION OF HIGH POLYMERS TO CELLULOSE. INFLUENCE OF STRUCTURE, POLARITY, AND TACK TEMPERATURE. A. D. McLaren. J. Polymer Sci. *3*, 652-62 (Oct. 1948). The adhesion of high polymers to cellulose is a function of tack temperatures and dielectric constants, ϵ, of the polymers and of dipole moments, μ, of polar groups. A plot of tack temperature versus mirror image force, $\mu_1\mu_2/\epsilon$, of copolymers gives an area of adhesion bounded by tack temperature of 100° C. and mirror image forces of 0.7 and 1.3 and opening toward lower tack tempera-

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tures. Outside of the area polymers do not adhere well to cellulose. By coating polymers on cellulose pretreated with Werner chromium complexes of acids bearing polar groups, it was found that adhesion is a specific function of the polar groups within the polymer and on the modified cellulose. Adhesion is strongest with approximately equal dipole moment substituents on the modified cellulose and in the copolymers.

LIQUID TRANSMISSION THROUGH EXTRUDED POLYETHYLENE FILM IN RELATION TO PACKAGING CHEMICALS AND COSMETICS. J. H. Parliman. Canadian Plastics *1948*, 33-4, 36-7 (July 1948). A method for measuring the rate of transfer of liquids through plastic films is described. Results obtained in tests made with 48 liquids and polyethylene film are reported.

Applications

RESIN BONDING OF SILICON STEELS IN ELECTRICAL LAMINATED CORES. S. B. Ashkinazy and J. J. Preisler. Product Engineering *19*, 85-9 (Nov. 1948). Magnetic laminated silicon steel cores are bonded with an adhesive composed of 99% polyvinyl acetate and 1% of a thermosetting phenolic resin. The bonding process and the properties of the finished cores are described.

POLYTHENE SAFETY JUGS OR BUCKETS FOR CORROSIVE LIQUIDS. Plastics (London) *12* 634-5 (Dec. 1948). Buckets and jugs for holding corrosive liquids such as acids are molded of translucent polyethylene.

POLYTHENE BATTERY CONTAINER. British Plastics *20*, 473-6 (Oct. 1948). A large aircraft battery case is molded of polyethylene.

TAILORED BUTTONS. British Plastics *20*, 418-21 (Sept. 1948). The manufacture of buttons from plastics is described briefly.

Testing

IMPROVED LOW-TEMPERATURE BRITTLENESS TEST. E. F. Smith and G. J. Dienes. A.S.T.M. Bulletin No. 154, 46-9 (Oct. 1948). An improved low-temperature brittleness tester, capable of testing five specimens simultaneously, is described. All machine specifications conform to A.S.T.M. Method D 746-44 T. Data are presented which show that many elastomers do not possess a sharp brittle point but are characterized by a distribution of failures over a temperature interval. The improved brittleness tester makes it possible to carry out the necessary statistical study of the distribution of percent failures versus temperature with a reasonable amount of work. A simple analysis of the resulting distribution curve is presented.

DETERMINATION OF DIETHYL PHTHALATE IN SMOKELESS POWDER. P. G. Butts, G. B. Prine, D. L. Kouba, and W. W. Becker. Analytical Chem. *20*, 1066-7 (Nov. 1948). Diethyl phthalate in solventless type smokeless powder can be determined by digesting a sample with potassium hydroxide and hydrogen peroxide, distilling from the reaction mixture the ethyl alcohol so formed, and determining the ethyl alcohol in the distillate by oxidation with potassium dichromate.

MEASUREMENT OF TEAR RESISTANCE. Plastics (London) *12*, 480 (Sept. 1948). A new instrument for measuring tear resistance of plastic sheeting is described.

U.S. PLASTICS PATENTS

Copies of these patents are available from the U. S. Patent Office, Washington, D. C., at 25¢ each.

ORGANOSILOXANES. J. F. Hyde and O. K. Johannson (to Corning Glass Works). U. S. 2,453,092, Nov. 2. Cyclic diorganosiloxane is polymerized to higher molecular weight polymers by reacting with an alkali metal salt of a triorganosilanol until polymerization is effected.

POLYMERIC N-VINYL PYRROLE. M. T. Orinik (to General Aniline and Film Corp.). U. S. 2,453,097, Nov. 2. A solution of N-vinyl pyrrole in chloroform which yields strippable coatings.

COPOLYMERS. A. D. F. Toy (to Victor Chemical Works). U. S. 2,453,167-8, Nov. 9. A copolymer of vinyl acetate or methyl methacrylate and diallyl or dimethallyl aryl phosphonates.

POTTING COMPOSITION. H. E. Wright, Jr. U. S. 2,453,174, Nov. 9. A potting and sealing composition for electrical devices comprising tri (*p-tert*-butyl-phenyl) phosphate and coumarone-indene resin.

EDGE GLUING. P. H. Bilhuber (to Steinway and Sons). U. S. 2,453,185, Nov. 9. Apparatus for continuous-feed, edge-gluing of strip elements comprising feeding means and high frequency electrodes.

VINYL RESIN. F. J. Binda (to Polaroid Corp.). U. S. 2,453,186, Nov. 9. A light-polarizer formed from vinyl resin sheet, which has been extended to orient the molecules and heated in the presence of an acid accelerator.

LIGNIN RESIDUES. E. Farber (to Timber Engineering Co.). U. S. 2,453,213, Nov. 9. Ligninic residues from hydrolysis of wood carbohydrates are mixed with alkali and heated until resinified.

ETHYL CELLULOSE. H. G. Figdor (to E. F. Houghton and Co.). U. S. 2,453,214, Nov. 9. A thermoplastic comprising ethyl cellulose, mineral oil, and a hard compatible resin.

ADHESIVE SHEET. J. W. Pearson (to Minnesota Mining and Manufacturing Co.). U. S. 2,453,258, Nov. 9. A pressure-sensitive adhesive sheet having a composite film backing and a pressure-sensitive eucohesive coating on one surface, said composite comprising a preformed hydrophobic film, a preformed hydrophilic moisture-permeable film, and an inter film of pressure-sensitive adhesive.

PLASTICIZER. C. E. Rehberg (to U. S.). 2,453,264, Nov. 9. A cellulose ester or ether plasticized with ethyl alpha-carbethoxyethoxy-ethyl carbonate.

RESINS. H. S. Bloch (to Universal Oil Products Co.). U. S. 2,453,298, Nov. 9. Resin prepared by reacting in the presence of a Friedel-Crafts catalyst an alkylbenzene, a phenol, and a dihaloalkane.

POLYVINYL BUTYRAL. R. D. Dunlop (to Monsanto Chemical Co.). U. S. 2,453,308, Nov. 9. Composition of polyvinyl butyral, dibutyl sebacate, trimethyl melamine ethyl ether, and monoethyl phosphoric acid.

COPOLYMERS. R. L. Hasche and E. M. McMahon (to Eastman Kodak Co.). U. S. 2,453,317, Nov. 9. Process for preparing copolymers comprising polymerizing vinyl chloride and isopropenyl acetate.

RESINS. P. D. Watson (to U. S.) U. S. 2,453,559, Nov. 9. A resinous material prepared by heating polylactylic acids, fatty drying oils, and an unsaturated dicarboxylic acid until partial polymerization is effected, then adding an oil soluble hydrogenated coumarone-indene resin, and finally removing volatile products until a viscous, elastic product is formed.

HEAT-CURABLE COMPOSITIONS. J. G. E. Wright (to General Electric Co.). U. S. 2,453,562, Nov. 9. A solid curable methylpolysiloxane obtained by condensing dimethylsiloxane copolymerized with monomethyl siloxane having incorporated therein an amount of a zirconyl nitrate sufficient to effect cure.

POLYVINYL ACETAL. (to Monsanto Chemical Co.). U. S. 2,453,569-70, Nov. 9. A composition comprising polyvinyl acetal, sulfur, and a blown ester of a polyhydric alcohol and a polyunsaturated aliphatic acid or a partial ester of a non-resinous polyhydric alcohol and a poly-unsaturated aliphatic acid.

CELLULOSE ETHERS. H. J. West (to American Cyanamid Co.). U. S. 2,453,608, Nov. 9. Water-soluble cellulose ethers are rendered insoluble by preparing an aqueous solution thereof with a methyl ether of polymethylol melamine and heating with an acid catalyst.

HOT MELT COATING. W. C. Steinkraus. U. S. 2,453,644, Nov. 9. Webs are coated by hot melt application of polyethylene, terpene resin, chlorinated diphenyl, and paraffin.

VINYL CARBOXYLATE. H. W. Bryant (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,453,655, Nov. 9. In a vinyl carboxylate polymerization process, the method comprising stopping reaction at any point by adding a thiourea derivative.

CATION-EXCHANGE RESINS. S. P. Rowland (to Rohm and Haas Co.). U. S. 2,453,687, Nov. 9. An insoluble, infusible, porous composition having cation exchange properties comprising a cured condensate of a sulfonphthalein and formaldehyde.

RESIN. A. P. Dunlop and E. A. Reineck (to Quaker Oats Co.). U. S. 2,453,704, Nov. 16. Artificial resins prepared by condensing a phenol with furfuryl alcohol at 100 to 220° C.

POLYMERIZATION. L. Fallows and E. V. Mellers (to Celanese Corp. of America). U. S. 2,453,788, Nov. 16. Polymerization in an aqueous medium of an ester or

means quality in consumer items

ELASTRON is the flexible polyvinyl plastic, compounded and extruded exclusively by Industrial Synthetics Corporation. ELASTRON will not crack, chip, peel, or rot, and resists rough usage. It is non-inflammable and is cleaned with a swish of a damp cloth. Colorfast brilliant hues combined with a variety of surface finishes such as high-gloss patent, box calf, pin seal and grosgrain impart the "superior quality" look to products made of ELASTRON.

saves finishing operations

ELASTRON extrusions are produced with smooth or beaded edges eliminating sewing or other edge-finishing operations. That's why ELASTRON is ideal for watch straps, suspenders, belts, baby harnesses, handbags, furniture webbing and upholstery piping, and straps and handles for luggage, radios and cameras.

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Tubes, rods, tapes up to 12" widths, and a wide variety of shapes are available, suitable for use as appliance bumpers, refrigerator gaskets, shower spray tubing and numerous industrial applications.

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INDUSTRIAL SYNTHETICS CORPORATION 225 NORTH AVENUE, GARWOOD, N. J.

nitrile of acrylic or methacrylic acid in the presence of potassium meta-bisulfite as polymerization promotor.

POLYMERS. T. F. Wood (to U. S. Rubber Co.). U. S. 2,453,824, Nov. 16. Polymerized alpha-acetoxymethyl acrylonitrile.

METHYLOL MELAMINE ETHERS. F. C. McGrew (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,454,078, Nov. 16. A crystalline monomeric ether of trimethylol melamine with a monohydric alcohol.

COMB HOLDER. C. E. Maynard (to Pro-Phy-Lac-Tic Brush Co.). U. S. 2,454,194, Nov. 16. Pocket comb holders prepared by continuous extrusion of hot thermoplastic material.

COPOLYMERS. T. H. Rogers and R. D. Vickers (to Wingfoot Corp.). U. S. 2,454,209, Nov. 16. A thermoset copolymer of vinyl chloride, vinylidene chloride, hexamethylenetetramine, and a heat-hardenable phenol-aldehyde condensate.

RESIN. R. H. Runk and R. D. Jerabek (to Westinghouse Electric Corp.). U. S. 2,454,210, Nov. 16. Moldable reaction product of pentaerythritol, maleic acid, and phthalic acid.

MOLDING COMPOSITION. L. M. Debing (to Monsanto Chemical Co.). U. S. 2,454,250, Nov. 16. A molding powder comprising a polyvinyl aromatic compound blended with insoluble, infusible amino-triazine resin.

RESIN. J. R. Mares (to Monsanto Chemical Co.). U. S. 2,454,255, Nov. 16. A composition comprising polystyrene and chlorinated meta-diphenyl benzene.

CELLULOSE ETHER. R. F. B. Cox (to Hercules Powder Co.). U. S. 2,454,273, Nov. 23. A thermoplastic consisting of a cellulose ether and methoxy phenol lactone as stabilizer.

COPOLYMER. J. S. Kirk (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,454,284, Nov. 23. A coating for metal comprising a half ester of styrene-maleic anhydride polymer esterified with a saturated monohydric aliphatic alcohol.

DIP TANK. W. H. Lerner (to Specialties Development Co.). U. S. 2,454,286, Nov. 23. Apparatus for melting thermoplastic resinous material and designed to serve as a dip tank.

COPOLYMER. J. C. Sauer (to E. I. du Pont de Nemours & Co., Inc.). U. S. 2,454,294, Nov. 23. An interpolymer of a polyhydric alcohol mixed ester of a monocarboxylic acid containing a double bond, and another double bond conjugated therewith, a drying or semi-drying fatty acid, and a vinylidene compound or a saturated butanedioic acid.

THERMOPLASTICS. V. C. Ehnborn. U. S. 2,454,437, Nov. 23. Device for working sheets of thermoplastic material.

INTERPOLYMERS. G. W. Stanton and C. E. Lowry (to Dow Chemical Co.). U. S. 2,454,486, Nov. 23. A vulcanizate of a mixture of a styrene-butadiene emulsion, vinylidene chloride-butadiene interpolymer, and a compound copolymerizable with vinylidene chloride-butadiene polymer.

BOOKS AND BOOKLETS

Write for these publications to the companies listed. Unless otherwise specified, they will be sent gratis to executives who request them on business stationery

"Standard Handbook for Electrical Engineers," edited by Archer E. Knowlton.

Published by McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. Price $12.00. 2311 pages.

The eighth edition of this 2311-page authoritative handbook of the electrical field is completely revised and condensed and, in addition, contains information on new magnetic materials, new insulations, and new chemical elements uncovered by atomic energy discoveries.

"Handbook of Plastics," by H. R. Simonds, A. J. Weith, and M. H. Bigelow.

Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 3, N. Y. Price $25.00. 1463 pages.

Included in this $25 handbook is information on plastics from raw material to the finished product. Details of manufacturing methods, machinery, and processes are presented. Plastic materials, manufacturers, and specific properties are listed.

Die and wear parts (Catalog No. 48-WP)—Prices and particulars on Talide-tipped centerless grinder blades, sheet metal draw dies, wire and tube dies, bolt dies, drill jig bushings, gages and solid carbide bars, and tubes and wear strips are contained in this 36-page catalog. Also included is considerable engineering and design data. *The Metal Carbides Corp., Youngstown, Ohio.*

The Plastics Institute Transactions, October 1948—This 136-page booklet is a compilation of lectures covering new raw materials, flame-spraying of metals and plastics, factors influencing properties of thermoplastics, post-forming laminates, silicones, and the choice of plastics materials. Objectives of the Institute and a list of its new officers are included. Price to non-members is 15/. *The Plastics Institute, The Adelphi, Adams St., London, W.C. 2, England.*

Eastman cellulose esters—The latest data on specifications and characteristics of the standard types of the company's cellulose esters, which include cellulose acetate, cellulose triacetate, and cellulose acetate butyrate, together with information on their uses with solvents, plasticizers, and resins is included in this revised, 38-page booklet. *Tennessee Eastman Corp., Kingsport, Tenn.*

Hercules CMC, cellulose gum—The physical properties and uses of the company's sodium carboxymethylcellulose are reviewed in this revised technical booklet. Included is information which indicates that purified-food-grade type of cellulose gum is now suitable for incorporation in foods and pharmaceutical preparations designed for human consumption. *Hercules Powder Co., Wilmington, Del.*

The Waterford Plant of the General Electric Co. (Bulletin CDC-102)—The company's new silicone manufacturing facilities at Waterford, N. Y., are described and illustrated in this 11-page bulletin which is, in effect, a pictorial introduction to the complexities of silicone manufacture. Included are brief descriptions of the outstanding characteristics and principal uses of the company's silicone resins, oils, greases, rubber, and water repellents. *Chemical Dept., The General Electric Co., Pittsfield, Mass.*

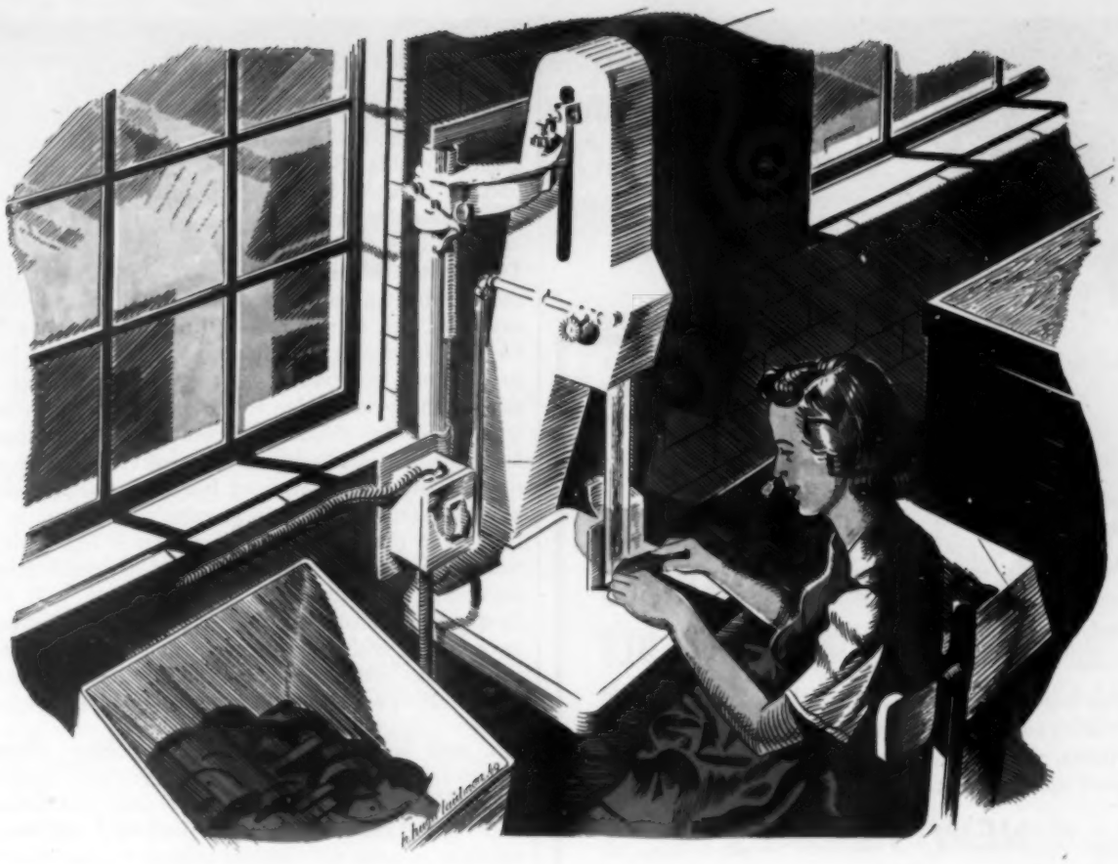
Polyplastex—This four-page brochure describes the company's material, Polyplastex, tells what the material is, shows typical applications, and presents general information on fabricating the product. Two enclosures consist of a price list and information on adhesives. Samples of the material are also included. *Polyplastex United, Inc., 92-35 Horace Harding Blvd., Elmhurst, N. Y.*

Air and hydraulic pressure and flow charts—The manufacturers of a complete line of standard air and hydraulic cylinders, boosters, air hoists, counterbalance units, and related products have made available air and hydraulic pressure and flow charts. One table in the chart gives push and pull stroke pressures. Another table shows pipe sizes necessary for hydraulic circuits. The chart is available in two sizes: a three-color 22 by 34 in. wall chart; and an 8½ by 11 in. notebook chart. *Miller Motor Co., 4027 N. Kedzie Ave., Chicago 18, Ill.*

Plastic aircraft tooling and tooling for transparent and optical plastics (PB 78210)—The activities of the Kopperschmidt firm of Blumberg, Baden, which was active during the war in the production of impregnated wood and acrylic tools and instruments, are discussed in this 221-page report. The report, which is supplemented with charts, tables, and illustrations, sells for $5.75. Checks or money orders should be made payable to the Treasurer of the United States. *Office of Technical Services, Department of Commerce, Washington 25, D. C.*

Handbook of industrial hazards from explosive dusts (PB 85197 & PB 85198)—An analysis of the nature and composition of dust, its origin, and its ignition is included in this two-volume study. A general discussion in the first volume is supplemented, in the second volume, with a description of dust conditions in various industries and analyses of several hundred instances of officially confirmed dust explosions. The text of the study is in German, with an abstract, foreword, and table of contents in English. Volume I sells for $3.00, Volume II for $4.25. Checks or money orders should be made payable to the Treasurer of the United States. *Office of Technical Services, Department of Commerce, Washington 25, D. C.*

A. S. T. M. standards on paper and paper products (with related information)—The fourth edition of this publication contains 77 specifications and test methods on paper and paper products which have been developed through the work of several of the A. S. T. M.'s committees. Some of the specifications covered are lime for cooking of rags in paper manufacture, waterproof paper



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for curing concrete, round phenolic laminated tubing for radio applications, and laminated thermosetting materials. Some of the test methods covered are machine direction, ash content, tensile breaking strength, drop test for bags, and vibration test for shipping containers. Copies of this 286-page book may be secured for $2.50 each by writing to *A. S. T. M. Headquarters, 1916 Race St., Philadelphia 3, Pa.*

Tenite specifications—The revised edition of this 42-page technical booklet contains tables of physical properties of the company's cellulose ester plastics in the various formulas and flows. A new feature is the emphasis on improved weather-resistance of cellulose acetate butyrate. Also included are the results of tests conducted on cellulose acetate and cellulose acetate butyrate, set forth in a series of charts and graphs. A new section of the revised booklet, entitled Miscellaneous Properties, contains graphs which supply information as to the softest flows of Tenite formulas that will not exude when subjected to various conditions of temperature and humidity; flows which will not affect lacquers; formulas and flows which may be used safely in contact with polystyrene and acrylic; and Tenite I formulas which may be used safely in contact with Tenite II. *Tennessee Eastman Corp., Kingsport, Tenn.*

Air and hydraulic pressure and flow charts—Easy-to-read data tables on air and hydraulic pressures and flow charts are given here for fast, convenient reference. One table, which gives push and pull stroke pressures in pounds for various cylinder sizes, also shows the oil consumption of hydraulic cylinders and the air consumption of air cylinders from 1½ to 20 in. bores. Another table shows pipe sizes necessary for hydraulic circuits and indicates friction pressure loss for various pipe sizes and conditions of pipe, and losses in various fittings and valves. Also included is a table for piston rod strength required on long stroke and heavily loaded cylinders. *Miller Motor Co., 4027 N. Kedzie Ave., Chicago 18, Ill.*

Finer chemicals—This nine-page booklet describes the company's activities in producing fine chemicals—industrial, medicinal, photographic, and analytical. *Mallinckrodt Chemical Works, Mallinckrodt St., St. Louis 7, Mo.*

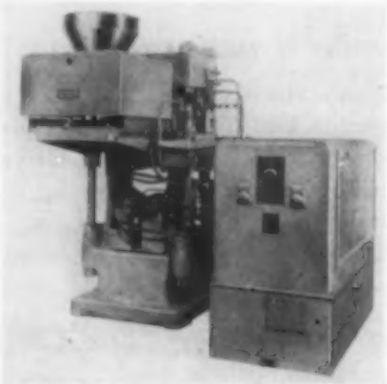
Wheelco thermocouple manual—The selection of the correct thermocouples, methods of checking thermocouples and pyrometers, and installation data are presented in this 40-page booklet. Current prices on thermocouples, thermocouple wire, lead wire, heads, connectors, plug and socket assemblies, insulators, protecting tubes, and radiation heads are all given. *Wheelco Instruments Co., 847 W. Harrison St., Chicago 7, Ill.*

Fabrication of Plexiglas V-100 extruded rods and tubes—Recommended shop procedures for handling Plexiglas V-100 moldings and extrusions are discussed in this two-page brochure. *Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa.*

Despatch laboratory ovens (Bulletin No. 106)—This brochure illustrates some of the company's ovens which are being used in such fields as plastics research, food technology and dehydration, synthetic rubbers, vitamin concentrate production, and blood plasma testing. Construction features of the ovens are discussed in some detail. *Boder Scientific Co., 719-721 Liberty Ave., Pittsburgh 22, Pa.*

NEW MACHINERY AND EQUIPMENT

Closure presses—F. J. Stokes Machine Co., 5934 Tabor Rd. Philadelphia 20, Pa., announces the redesign of its fully automatic 50 and 150 ton closure presses. These presses require only 15 sec. plus curing time to automatically load, close, open, unscrew, and eject closures. As many as 5400 24-mm. closures can be molded per hr. on the 150-ton model; a minimum number of cavities are said to be required for a specified daily output. New features include: a redesigned die transfer and rack cylinder; plug-in type electrical connections which simplify set-up and maintenance of electrical circuits; heat resistant synthetic rubber stripper bars to eliminate possibility of cap spoilage and assure positive removal of caps from the forces; stripper bars which can be positively aligned by a single adjustment; and an improved unscrewing mechanism. The presses are designed for steam or electric heating. The 150-ton model can take a maximum mold or die area of 19½ by 24 inches.



Color inlay press—Printing Industries Equipment, Inc., 135 W. 20th St., New York 11, N. Y., announces a new method of inlaying colors in plastics through use of its new Stamp-O-Matic color inlay press. The machine inlays three colors at one feeding at the rate of 50 to 60 finished pieces per minute.

Hydraulic press control unit—Model No. 140-X Robotron, a control unit for performing automatic bumping operations on hydraulic presses, is announced by Emmett Machine & Manufacturing, Inc., 2249-29 14th St., S.W., Akron 14 Ohio. The unit is recommended for processes where change of cycles or molds are common and where complex bumping combinations are necessary. As many as 40 bumps are possible during any one cycle of operation. The unit is equipped with three built-in time arrangements and is wired for use with limit switches which 1) regulate the amount of press opening during the bumping operations, 2) close the press after a predetermined time, and 3) hold the press closed until the next bump. It provides a range of 21 different cure times for each setting of the time range switch.

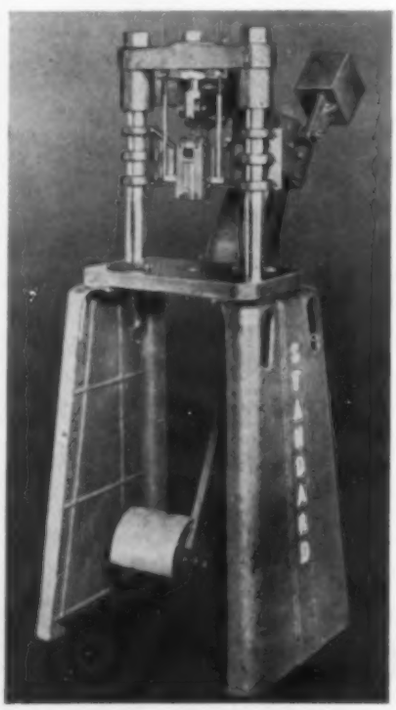
Temperature control—Simplytrol, an automatic temperature control for use on plastics molding machines and for other applications where temperatures must be held within close limits, has been introduced by Assembly Products Inc., Main at Bell St., Chagrin Falls, Ohio. Involving a contact-making pyrometer that automatically turns heat on and off as needed the Simplytrol holds compression molds, whether steam or electrically heated, at any selected molding temperature up to 500° F.

Temperature indicators—Additional temperature ratings of Tempilstiks° (crayon), Tempilaq° (liquid), Tempil° Pellets are announced by Tempil° Corp., 132 W. 22nd St., New York 11, N. Y. All three products are available in 12½-degree intervals from 113 to 400° F. From 400 to 1600° F., Tempilstiks° and Tempilaq° are available in 50-degree increments. Tempil° Pellets can be had up to 1700° F.

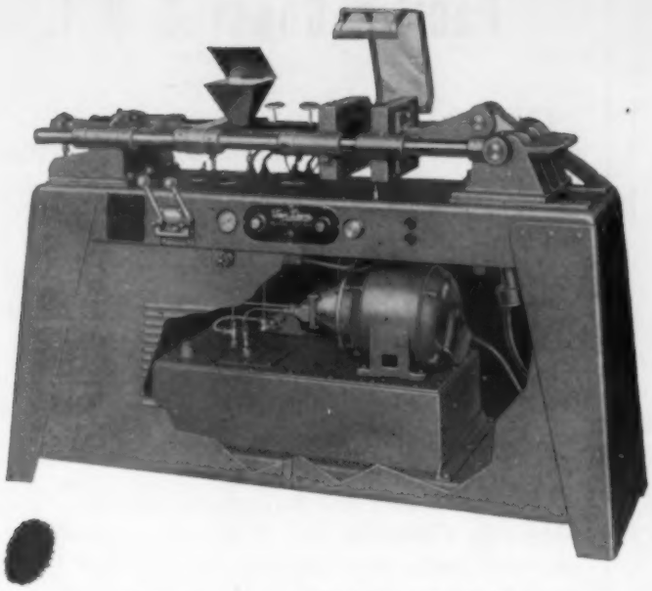
Manual control valve—A new line of manually actuated four-position, dual pressure valves for use on accumulator actuated high and low pressure presses employing water or oil as a service medium is announced by Saval, Inc., 1915 E. 51st St., Los Angeles 11, Calif. A lever with an arc of 90° permits the separate introduction of low pressure and high pressure fluid. The valves, all for pressures to 7000 p.s.i., are furnished in four sizes—from ¾ to 2 in. N.P.T. The largest size measures 6½ by 6½ by 6. Only 12 lb. at the end of an 8-in. handle are required to actuate at 5000 p.s.i.

Preheater—Model 67, a plastic preheater for large molding jobs, is announced by W. T. LaRose & Associates, Inc., Troy, N. Y. This portable Thermall preheater requires 27 by 34 in. of floor space, is rated at 10 kw. output, and will take 6 to 7 lb. of compound per minute.

Air vent—Speedyvent, a high pressure air vent for steam-using equipment, is offered by Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass. Four models, which will handle pressure ranges up to 600 p.s.i., are available. The vent provides rapid and continuous escape of air from equipment and piping while closing against both steam and hot or cold condensate.



Toggle press—A foot - operated Little Giant toggle press for light embossing and drawing operations on cellulose nitrate, acrylic, cast phenolic, and other plastics materials is announced by Standard Tool Co., 383 Water St., Leominster, Mass. This press is also being found useful in degating injection molded pieces. Specifications are: size of bed, 12 by 20 in.; maximum stroke, 2¾ in.; maximum shut height, 5¾ in.; minimum shut height, 4⅜ in.; adjustment on screw, 1½ in.; weight 455 pounds.



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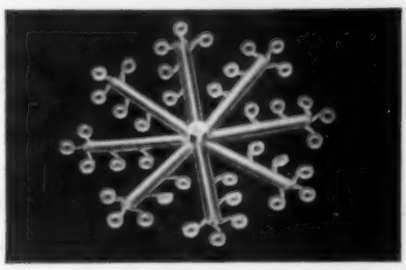
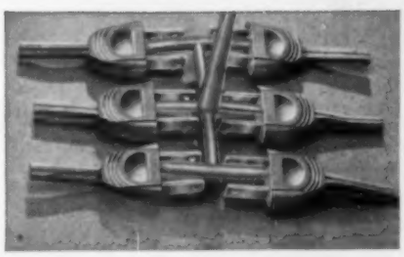
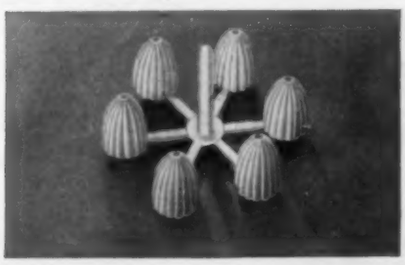
These items are typical of *hundreds* being produced *at lowest possible price* on Van Dorn plastic presses. For these 1 oz. injection presses mold practically all thermoplastics including nylon. Moderately priced, they use inexpensive molds and operate 8 hours for under one dollar. *No wonder these versatile presses quickly repay their cost!*



Polyethylene
¼ ounce
5¼" dia.



Vinyl Chloride
1 ounce
5½" x 3¼"



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Pacific Coast S. P. I.

THE Sixth Annual Spring Conference of the Pacific Coast Section of the Society of the Plastics Industry was held in Santa Barbara, Calif., on March 17, 18, and 19.

Papers presented

"Practical Molding," by E. F. Borro, Durez Plastics & Chemicals, Inc. A discussion of the six factors in successful molding: design, selection of material, preheating, method of molding, mold design, and finishing. The production of large molded phenolic parts was also discussed.

"Vinyl Molding and Extrusion," by David Plumb, Monsanto Chemical Co. A review of the statistics on vinyl resin consumption, the manner in which those resins are manufactured, and such new trends as textile converters in the vinyl field, acceptance of vinyl for wearing apparel, and vinyl for floor covering.

"Techniques for Handling Polyethylene Resins," by J. K. Honish, Bakelite Corp. A discussion of the properties of polyethylene and the manner in which the material is processed.

"Low Pressure Laminating Using Polyester Resins," by J. H. Wyckoff, American Cyanamid Co. Polyester laminates are made with no pressure, with fluid pressure, and with positive pressure. Production problems are still solved by trial and error.

"Polystyrene—The Work Horse of the Thermoplastics Industry," by W. C. Goggin and G. B. Thayer, Dow Chemical Co. As a result of cooperation between materials companies and molders, polystyrene has been improved. It now boasts lower cost, improved moldability, better light stability, and greatly improved heat resistance.

"Fabric Coating with Vinyl Plastisols," by George B. Koch, B. F. Goodrich Chemical Co. Plastisols have a great future in the fabric coating and low pressure molding fields. The advantages are illustrated by a detailed case history.

"Alkyd Molding Compounds," by W. N. Shepard, Plaskon Div., Libbey-Owens-Ford Glass Co. Molding materials based on alkyd resins are so fluid at molding temperatures that they create a new concept of compression molding. The resultant equipment changes are discussed.

The following papers were also presented: **"Right or Left in Labor Relations,"** by J. E. O'Hagan, Allied Records Co.; **"Preview of Progress,"** by W. A. Dew, E. I. du Pont de Nemours & Co., Inc.; **"Designing for Production in Plastics,"** by J. O. Reinecke, Industrial Designer; **"Put Your Supplier's Dollars to Work for You,"** by D. L. Gibb, Dow Chemical Co.; **"End-Use Selling of Plastics,"** by A. R. Olson, Hercules Powder Co.

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S. P. I. Conference (Canada)

THE Seventh Annual Conference and the Annual General Meeting of the Society of the Plastics Industry (Canada) Inc., were held at Niagara Falls, Ontario, on February 15 and 16.

The guest speaker at the dinner meeting was R. E. Oliver of the Public Relations Div. of the Ford Motor Co. of Canada Ltd. The speakers at the two luncheons were Don Henshaw, MacLaren Advertising Co. Ltd., and Charles A. Breskin, Publisher and Editor-in-Chief of MODERN PLASTICS. Mr. Breskin urged intensive study throughout the industry to develop products of practical value and quality, with costs controlled so as to bring goods to the consumer at prices which the public will pay.

Papers presented

"The Effect of Informative Labelling on the Plastics Industry, Its Sales and Its Profits," by Elmer French and Charles Sandak. Mr. French, of Firestone Plastics Co., is chairman of the S.P.I. Committee on Informative Labelling and Mr. Sandak has been retained as marketing counsel to that committee. Their paper outlined the plan which the committee will present to the S.P.I. convention in May.

"Merchandising," by William R. Dixon, Dow Chemical Co. Mr. Dixon declared that end product manufacturers must take the responsibility for product quality, efficiency of distribution, and the establishment of fair pricing practices.

"Plaskon Alkyd Molding Compound," by H. E. Murray, Libbey-Owens-Ford Glass Co.

"Injection Molding is Big Business," by E. L. Hobson, Monsanto Chemical Co. A history of injection molding and a discussion of pin-point gating.

"The Calendering and Sheeting Industry," by Robert Dettelbach, B. F. Goodrich Chemical Co. A discussion of problems and prospects.

"Arborite—The New Canadian Decorative Laminate," by R. M. Richardson. A discussion of the properties of a laminate with lignin-impregnated, phenolic core and melamine-impregnated surface.

"The Plastics Industry in a Changing Economic Climate," by John Sasso, *Business Week* magazine.

Officers elected

The following officers were elected for the ensuing year: President, L. C. MacLeod, Monsanto (Canada) Ltd.; Vice-president, Howard Yates, Crystal Glass & Plastics Ltd.; Treasurer, T. J. Carey, Canadian General Electric Co. Ltd. Councillors elected were: G. Murray Scott, Dow Chemical Co. of Canada, Ltd.; Geo. Whyte, Dominion Comb & Novelty Co.; C. L. Gretsinger, Joseph Stokes Rubber Co. Ltd.; J. W. Smith, Haugh's Products Ltd.; R. J. Southwell, Canadian Resins & Chemicals, Ltd.

COURTESY TENNESSEE EASTMAN CORP.

Twenty-four cellulose acetate parts, and four rubber wheels are used to produce 8¼-in. model of the new Oldsmobile

Oldsmobile Model

PLASTIC scale models are fast becoming one of the most widely used tools for building good will and sales for automobile dealers. There are plastic scale models of the Ford, Hudson, Plymouth, Kaiser, and Packard. One of the most realistic of these, 8¼-in. long model of the Oldsmobile Futuramic, is produced by Cruver Mfg. Co., Chicago.

The model, scaled at 25 to 1, was designed from Oldsmobile plans and from measurements taken directly from a full size Futuramic. It has 28 assembled parts—24 of Tenite cellulose acetate, and four rubber wheels.

The main part of the car, the body, is molded in a single cavity die in an 8-oz. Reed-Prentice machine. Tan, blue, or green Tenite is used.

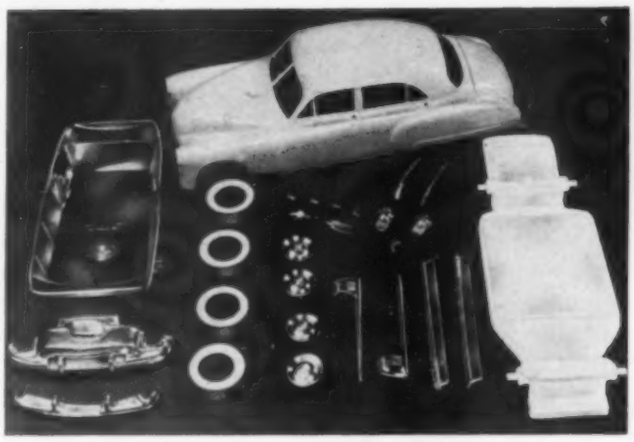
The other molded acetate parts are produced in a combination die on an 8-oz. HPM machine. The die makes one chassis piece, four door handles, one front bumper, one front emblem, one hood ornament, two headlights, two body strips, two rear fender guards, one rear bumper, two tail lights, one trunk handle, and four hub caps. All of these parts, with the exception of the chassis piece, are plated by vacuum deposition before assembly so that they will look like the corresponding chromium-plated parts on the real Oldsmobile.

A single formed piece of transparent acetate is used for all the windows of the model. Borkland Laboratories, Marion, Ind., forms this acetate piece so that it fits exactly inside the body of the car. A bubble is formed in the top of this piece to clear the stub of the sprue in the body piece. The bubble resembles a large dome light.

The first step in assembling the model is mounting the trim strips, door handles, and other small parts on the body. The combination die used to mold these parts produces a few extra pieces of the smallest parts to make up for the unavoidable losses which occur during handling. Each door handle is only ¼ in. long and 1/16 in. wide. Despite their small size, however, the door handles are molded so accurately that they can be assembled by snap fit and will stay in place securely without the need of cementing.

After the small parts are in place, the acetate window assembly is cemented to the inside of the body. In a sub-assembly, the hub caps are put into the rubber tires and attached to the chassis. This chassis assembly and the two bumpers are then put together with the body in the final operation. The front bumper has a recess into which the chassis is locked. The rear end of the chassis engages a stud on the body which is swedged with a hot soldering iron.

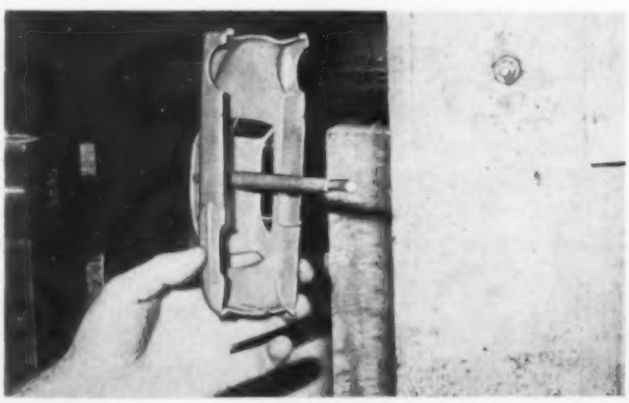
Scaled from Plans



PHOTOS ABOVE AND BELOW COURTESY CRUVAR MFG. CO.

Components of scale model. All trim, such as handles, bumpers, etc., are plated to simulate real chromium parts

Car body is molded in a one-cavity die. A bubble in acetate part will cover the sprue mark and double as dome light



Miniature promotion telephone is molded of cellulose acetate. Disks are letterpressed on white cover paper stock

Promotion Telephone

KEEPING the public constantly reminded of a product, service, or slogan is a major concern of all advertisers. The best known method of doing this is by constant repetition—and sometimes plastics can aid the repetition. For the past few months the River Raisin Paper Co., Display Div., Monroe, Mich., specialists in the creation and production of promotional and merchandising point-of-sale counter and window displays, has been placing advertisements in trade journals featuring the slogan "One Call for All." The idea is that one call to the company will bring many services which normally are performed by a number of separate companies. The ad shows a telephone with the numbers in the dial holes replaced by the various services which River Raisin offers.

Phone molded of acetate

It occurred to the company that a miniature telephone with the dials imprinted in the same manner would effectively dramatize the campaign. The phones are used by the company's salesmen as calling cards. The small phones, which are approximately 6½ by 3½ by 5 in., are injection molded of Tenite I cellulose acetate by Milwaukee Plastics, Inc., Milwaukee, Wis. The base is molded in a two-cavity die, and the other parts (handle, mouth cap, ear cap, strip, and dial) are molded in a 10-cavity combination die. The large and small disks, which are letterpressed on white Dura-Glo cover paper stock, are supplied by Milprint, Inc., Milwaukee, Wis.

The River Raisin Paper Co. reports that the miniature plastic phone has met with much success in promoting business, and that it has brought many inquiries from companies who are possible users of the services which River Raisin offers in creating and producing advertising and promotion displays.

Each type shaving brush sports a different container. Mustached heads are actually receptacles for used razor blades

Shaving Brush Quartet

A GROUP display, composed of four shaving brushes packaged in containers of acetate and polystyrene and made to resemble the old barber shop quartet, has been designed by Sid Bersudsky & Assoc., Toronto, Canada, to package brushes manufactured by the Rubberset Co., Ltd. of Canada.

Each plastic case is composed of two parts: a tapered, hollow, transparent body fabricated of 0.010-in. acetate with a collar silk screened on, and a head molded of polystyrene in two sections. The features on each head are also applied by silk screening. The head of the container fits snugly into the body and is hollow but with a solid base. The four plastic containers vary in height and diameter and different colors are used on the heads.

Practical features of the old Saturday night foursome include its value as a counter display unit, its possible use as a travelling kit container, re-use of the acetate body as a drinking cup or emergency shaving mug, and use of the head as a repository for used razor blades. Moreover, the containers are washable and durable and will stand wear and tear not only on bathroom shelves but as a child's plaything as well.

The base of the display is made of flocked and lacquered wood and laminated acetate. It is so constructed that it may be swung out to hold eight brushes instead of four. The manufacturer's name is suspended from a red and white barber's pole set at one end of the base.

Molded T-Square

A TRANSPARENT polystyrene T-square, reported to be the first one with head and blade made in a single molded piece, is being produced for Instrumaster Industries, Inc., Chicago, Ill., by the Cruver Mfg. Co., Chicago. Transparent polystyrene was chosen as the material for the instrument because it permits full and unobstructed visibility of the surface on which the T-square is placed.

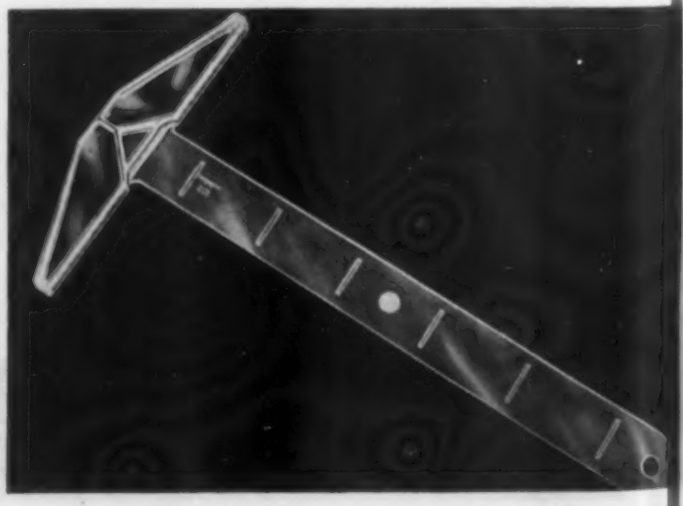
The Instrumaster, which is the trade name of the new T-square, is injection molded in a single cavity mold on a 22 oz. press. The molded T-squares come in blade sizes of 15, 18, and 24 inches. The over-all length of the whole piece is approximately 3 in. more in every case. Permanent accuracy is assured because the instrument is one solid piece and the head cannot come loose from the blade.

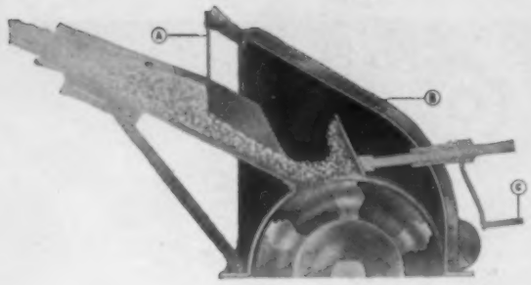
Ribs on both surfaces

The blade is provided with evenly spaced ribs on both surfaces. These ribs, which protrude 0.020 in., enable the T-square to be moved smoothly across the working surface of the drawing paper. This also means that pencil smudges and blurred lines are greatly reduced. In addition, the ribs permit ink drawing without danger of smears.

The head of the T-square is of sturdy rib construction with an ample radius at the point where blade and head merge. The thickness of the head, which extends symmetrically with respect to the blade, offers a guide edge against the drawing board, no matter which side of the blade is used. Thus, both sides of the T-square are equally usable, thereby offering greater convenience and assuring longer life.

Head and blade of the polystyrene T-square are made in one molded piece. Transparency permits full visibility of work





Scrap Grinding Improved through new mill feed control

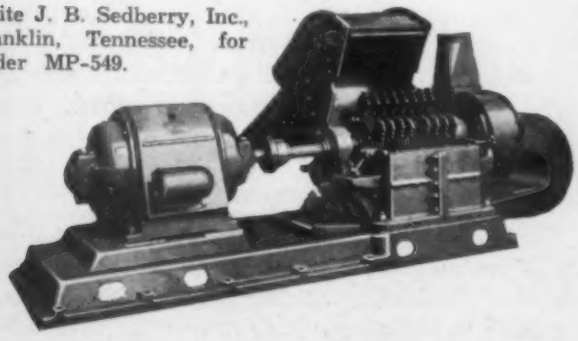
Volume production of fine ground plastic particles demands care in grinding.

The manufacturers of JAY BEE Hammermills (used for grinding plastic scrap) have developed a new type constant feed control which improves quality of ground plastic and steps up volume production.

The control feeds a pre-determined volume of scrap to the mill through gate "A" above, Baffle "B" holds the scrap over the hammers until it has been shattered fine enough to pass between the baffle and hammer tips to the screen below. Scrap is ground "in suspension" over the hammers. There is no rubbing or friction to melt the scrap. This produces a more uniform particle size, and, since heat is eliminated there is little chance of clogging the mill.

JAY BEE manufactures nine models of hammermills from 3 to 200 hp., direct or belt driven.

Write J. B. Sedberry, Inc., Franklin, Tennessee, for folder MP-549.



Fluorescent lighting fixture shields, made of polyester in several patterns, are light weight, come in varying lengths

Polyester Light Shield

AN innovation in home lighting is a modern fluorescent lighting fixture, the shield of which is made by United States Rubber Co., New York, N. Y., of Vibrin polyester. The plastic shields, which are designed to be used in any room in the house, are used with fixtures made and sold by the Markstone Mfg. Co., Chicago, Ill.

Light is diffused

In the new type fixture, the light is softly diffused through the ribbed polyester shield, which is so designed that it fully encloses the lighting fixture. Thus, no dust or other foreign matter can collect inside.

The shields, which vary in length from 17 to 50 in., are reported to be light in weight, shatter-proof, and unaffected by normal temperature changes. They may be easily cleaned with soap and water and according to the manufacturer, they will not discolor with age.

The plastic shields are made with attractive patterns. They are produced in soft monotones for the living room, dining room, bedroom, bathroom, and den, and in bright colors for the kitchen and breakfast nook. Jack-in-the-box and teddy bear patterns are available for the nursery and playroom.

A rich color trim at each end of the fixture completes the decorative appearance of the plastic shield. The color trim comes in attractive shades of jeweler's gold, chrome, rose, blue, and Chinese red.

The fixtures with their polyester shades can easily be installed by home owners, either by attaching to a standard ceiling light holder or by mounting flush to the ceiling.

Tetrafluoroethylene Packing

PACKINGS of tetrafluoroethylene or Teflon in braided form on spools or in rings for endless ring use are being marketed by Crane Packing Co., Chicago 13, Ill., for packing valves, centrifugal and rotary shafts, reciprocating rods, etc.

These products are known as Chemlon packings. Two types of round cross-section braided spool-form packings, in sizes from ⅛ to 1 in., are available. Style 706 is treated with a chemically resistant lubricant that is unaffected by acids or caustics to 300° F. Style 704, braided of Teflon alone, is recommended for applications where operating temperatures are beyond 300° F.

The rings, which possess required packing resilience, also come in two types: Style 772 containing no lubricant, and Style 776 impregnated with graphite throughout the fibrous structure.

The special properties of Teflon lend themselves to these products. The packings are not affected by any solvent acid mixtures, acids, or caustic solutions at temperatures to 690° F. Their non-adhesive properties prevent excessive wear of reciprocating rods, shafts, and valve stems.

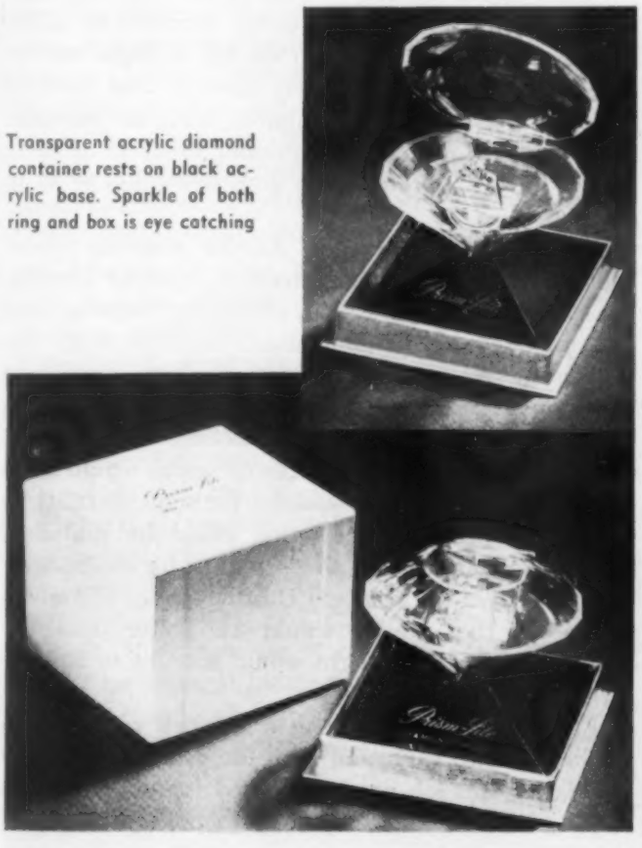
Packings of tetrafluoroethylene in braided or ring form are solvent- and acid-resistant at temperatures to 690° F.

Acrylic Diamond Box

DRAMATIZATION of jewelry packages to make them symbolic of the gift occasion — graduation, anniversary, engagement — has increased sales of quality and novelty lines alike. As a result, more and more jewelry makers are turning to such packaging.

A package for a diamond engagement ring which plays up the gift occasion and, at the same time, provides strong brand identification, has recently been introduced by The Prism-Lite Div., Schless-Harwood Co., Inc., New York, N.Y. The container is a large faceted diamond, molded of clear acrylic in two pieces and held together at the back by means of a pin hinge. An acrylic platform with slotted clips is mounted inside to hold the ring. The transparency of the acrylic plays up the sparkle of the gem inside.

The diamond shaped container rests on a base molded of black acrylic with the trade name, Prism-Lite, reproduced on it in gold. The black base, which replaces the traditional velvet lining usually associated with ring boxes, has a square bottom which, in turn, fits into the base of a square set-up box. All acrylic parts for this display container are being molded of Plexiglas by the Plastics Div., General Electric Co., Pittsfield, Mass.



Transparent acrylic diamond container rests on black acrylic base. Sparkle of both ring and box is eye catching

New Markets

(*Continued from page* 60)

characteristics are stated to be superior to regular materials, 12 lb. having been preheated in a 7 kw. unit in less than 1½ minutes. Mold release properties are reported to be excellent.

What of the future?

Given new big presses, given more powerful electronic equipment for preheat, given materials handling devices to deliver the powder to the press and take the moldings away, given tool rooms capable of maintaining huge dies, given new plastic materials to cure at lower pressures yet produce fine products—where does the compression molder go from here?

Again, it's a matter of economics. The air conditioning field awaits plastics housings of a size not considered before. The retail store field, particularly food stores, taking a cue from the Toledo scale housing and other devices, awaits larger moldings, especially in urea.

The furniture field is wide open for plastics development. One large furniture manufacturer has in plan a standard drawer 7 in. deep, 18 in. wide, and 31 in. long. The unit is to be molded with no front, so that it may be attached to wood fronts which match the furniture. Molded area amounts to 7.1 sq. ft. and the section would run approximately ⅛ inch. At 14.3 oz. per ft., the weight would be 6.3 pounds. Material cost at 17¢ a lb., figuring 22.4 grams at the cubic inch, would amount to $1.20. Figuring a mold cost of $7800 for a single cavity, the job could be completely molded and finished for $2.90 per unit, as compared with an accepted factory cost for the same number of units of $2.10 for the drawer produced in gum wood and $2.80 in maple.

Look at the advantages! All the machine operations of sawing, planing, drilling, counter sinking, screwing, rabitting, gluing, clamping, staining, and polishing could be eliminated, together with the necessary space involved for machine tools and manpower and storage. The drawers would be designed to nest, with a further saving in warehouse and shipping space. No cracks or seams would exist to open and corners would be rounded, permitting ease of cleaning. Partitioning could be included. Low friction phenolic slides would be molded integrally with the drawer. Costing about the same as wood, the quality would be better, and the saving in shipping weight would amount to 50 percent.

From England has come a cabinet with a case molded in two parts and with molded drawers. The molds for this job are being used for experimental testing in this country at the present time. A result

may well be a molded kitchen wall cabinet; with the cheapest cabinet wood costing more than $130 per thousand board feet, such an item could have a big market.

New hope for higher volume

For the first time all doubt as to the possibilities of large compression moldings is erased. Molders now know that it can be done and that it will pay to do it. Customers also know that it can be done, and with economies. The making of large molded pieces means new hope for still higher volume for both phenolic and urea molding compounds.

In general the product and market development in the field of big new pieces has been done largely by material makers. Indeed, few present orders have been the result of development and sales effort by the molders who received them. But some molders equipping to take this new business in big pieces are also preparing to do product development work. This will mean more orders from more industries. It is an important step in the right direction.

Acknowledgments

The editors wish to thank the following men for their cooperation and encouragement in the preparation of this article:

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S. D. Hiltebrant, sales manager, Molded Plastic Div., The General Industries Co.

C. M. Norris, vice-president in charge of production, and Barto Attig, sales manager, American Insulator Co.

E. D. Lucas, Jr., Public Relations, Philco Corp.

Shear Impact

(*Continued from page 97*)

application of heat or by standing at room temperature for 24 hr. and included the following: 1) modified phenolic, heat setting, 2) neoprene/phenolic, heat setting, 3) rubber/casein latex, room temperature setting, 4) Buna N/vinyl, room temperature setting, and 5) Buna N/phenolic, room temperature setting.

Statistical analysis

As no previous experimental work had been done in this laboratory with the A.S.T.M. block shear impact test method, three adhesives, representative of each type studied in this report, were chosen for a statistical analysis to determine the reproducibility and reliability of the method. The results in Tables I and II indicate that the method is sufficiently reliable for experimental work with each type of adhesive provided the thickness of the adhesive bond in the shear impact specimen is maintained uniform and constant.

Adhesive thickness

Preliminary investigations employing the shear impact method resulted in variations in test data which reflected on the reliability of the method. Further work (Table II) proved that variations in the thickness of the bond was a major contributory factor to these discrepancies. Where the adhesive is resilient and has a relatively low modulus of elasticity, there appears to be a linear relationship between shear impact strength and adhesive thickness.

This relationship should be considered in terms of the physical properties of the members of the joint. The extent of the relationship between shear impact strength and the adhesive thickness may vary depending upon the relative moduli of elasticity of the bonded members and that of the adhesive. Where the modulus of elasticity of the adhesive approaches that of one of the members of the bond, it is possible that the extent of the dependence of shear impact strength on adhesive thickness will decrease.

In contrast to the air-dry solvent adhesives, increased thickness of resorcinol adhesives appears to result in slightly decreased values. This decrease is probably the result of many factors among which must be considered the effect of strain set up by excessive shrinkage of adhesive during cure and the effect of cleavage forces at greater bond thicknesses.

One of the factors not considered in this report is the influence of the thickness of the primer coat on the shear impact strength of resorcinol/primer adhesive combinations. As many of the primers consist partially of rubber and thereby possess resilience and a relatively low modulus of elasticity, the effect

of increased primer thickness may be that of attaining higher impact strengths.

Exposure to heat

Shear impact data in addition to providing additional information on the strength properties of an adhesive often serve to emphasize weaknesses which are not made apparent by shear tensile data. This point is clearly demonstrated by comparing the results of shear impact and shear tensile specimens subjected to similar experimental conditions, as reported in Tables III to VI.

For example shear impact and shear tensile specimens bonded with resorcinol/primer adhesive combinations and subjected to continuous exposure to heat at 140° F. for 28 days are affected in directly opposite manner. In every case there is a decrease in shear impact strength with some of the specimens reduced to negligible shear impact resistance. Shear tensile specimens, on the other hand, maintain their relatively high strength properties. A study of the type of break of control shear impact specimens not subject to exposure to heat shows failure occurring in the phenolic. After exposure, failure occurs in the interface between the primer and the brass. From this, it appears that exposure to heat has a weakening effect on the adhesion of the primer to the brass detectable by the shear impact method of testing.

Exposure of the air-dry solvent adhesives to heat results in large increases in shear tensile strengths but with very little change in shear impact strengths.

Surface preparation

The abrading of phenolic surfaces by sanding in the preparation of specimens prior to bonding appears to be a critical factor in the attainment of high shear impact and shear tensile strengths, particularly where resorcinol adhesives are employed. Results in Table IV indicate that failure to sand phenolic surfaces decreases the shear impact strength of specimens bonded with resorcinol to almost negligible values with failure occurring at the phenolic-adhesive interface. With sanded specimens, failure usually occurs in the phenolic. It is believed that this increase is partially due to the removal of any parting agent and/or highly polymerized resin on the surface which may be present and to an increase in the effective area of bonded surface.

In the case of the Thiokol and the two air-dry solvent adhesives tested, the effect of sanding is not as pronounced as with the resorcinol adhesives. Although results indicate small increases, this may be partially due to possible differences in the thickness of the adhesive bond between the control and experimental specimens.

Testing at — 40 and +170° F.

Tests conducted at two temperature extremes, —40 and +170° F., stress not only the important

differences in the various types of adhesives but also the divergent behavior of these adhesives when under shear impact and shear tensile stresses. The shear tensile strength in most cases appears to increase at —40° F. whereas the shear impact strength at the same temperature will increase or decrease depending to a great extent on the modulus of the adhesive or primer at lower temperatures. For example, at —40° F. the impact specimens bonded with Thiokol fail at 6.2 ft.-lb. with failure in the phenolic. At the same temperatures the impact specimens bonded with resorcinol using neoprene/phenolic primer fail at 2.7 ft.-lb. with failure also occurring in the phenolic. The difference in modulus between the Thiokol and the resorcinol resin appears to account for the differences in results.

Setting rates

The stress required to break impact and tensile specimens after exposure to 77° F. and 50% relative humidity for various lengths of time serves as an indication of the rate of set of adhesives. The results in Table VI point up some of the differences between air-dry solvent and resorcinol adhesives very effectively.

The specimens, both shear tensile and impact, bonded with resorcinol adhesives achieve the greater part of their strength in less than a week and thereafter increase, if at all, very slowly. These specimens usually break in a characteristic manner with failure occurring in the phenolic.

Air-dry solvent adhesives in contrast, dry relatively slowly and do not reach within 7 days the high shear tensile and impact strengths of the resorcinol adhesives provided the adhesive thicknesses of the shear impact specimens are kept below 5 mils. In greater bond thicknesses, the initial shear impact strength of an air-dry solvent adhesive may exceed that of the resorcinol adhesive even though failure does not occur in the phenolic (Table II).

Shear impact specimens bonded with Thiokol with an adhesive bond thickness of 5 mils approximates the strength of the resorcinol adhesives. However, its shear tensile strength is low, being in the same class as the air-dry solvent adhesives.

Summary

The shear impact method can be employed as an important technique in the evaluation of the strength properties of adhesives. The method is reproducible and reliable when adhesive bond thicknesses remain constant.

The detrimental effect of exposure to heat on the strength properties of some resorcinol/primer adhesive combinations can be detected by the shear impact method even when no decrease in strength can be found with the shear tensile method.

The sanding of phenolic surfaces is a critical factor in attaining high shear impact and shear tensile strengths with specimens bonded with resorcinol adhesives.

Of the three types of adhesives studied, the resorcinol adhesives set the fastest, achieving their maximum shear impact strength and a major portion of their shear tensile strength within 1 week.

Bearing Strength

(*Continued from page* 100)

to be less in this case because of larger pin diameter.

In order that the load would be applied uniformly to the top of the specimen a special seat was built as shown on top of the specimen in Fig. 2. The seat consisted of half of a cylinder seated in a block as shown, the flat side of the half-cylinder resting on the specimen. In this manner any misalignment of the specimen would be accommodated in one direction by the special seat and in the other direction by the specimen turning on the pin.

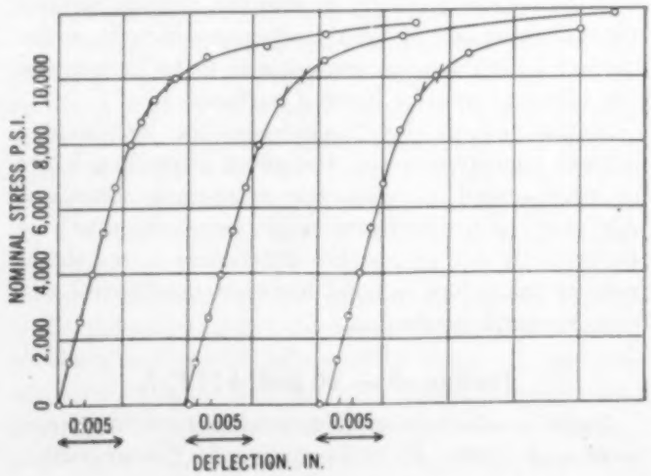
Test procedure

The specimens used in this test were machined to the dimensions shown in Fig. 3. The hole was drilled $^{31}/_{64}$-in. in diameter and reamed to ½ inch. In the case of specimens thicker than ½ in., the specimen was machined on one side until the thickness was ½ in., while in the case of specimens ½ in. in thickness or less, the specimen was tested full thickness.

Three specimens were cut from each sample submitted for test. The average of the yield points of the three specimens is reported as the yield point of the material. The specimens were conditioned at a temperature of about 78° F. for at least 96 hr. before testing. The specimens were conditioned in a desiccator over a saturated solution of calcium nitrate to hold relative humidity at about 55 percent.

The specimens were tested in a 60,000-lb capacity

8 — Polyvinyl chloride acetate (VS-5300)



PARAPLEX G-50

Extraordinary Life Insurance FOR YOUR VINYL COMPOUNDS

NO PREMIUMS to pay for the best in plasticizer performance. PARAPLEX G-50 is the polymeric plasticizer at a monomeric price—the modifier whose non-migratibility, low volatility, and non-extractibility will bring long-life to your supported and unsupported upholstery film, to footwear, electrical insulation, shower curtains, table covers, garden hose. And there's no fine print in this plasticizer policy—PARAPLEX G-50 NOW COSTS LESS THAN MOST MONOMERICS!

MAXIMUM PROTECTION is yours if you endow your vinyl products with a softness and flexibility that's there to *stay*. Like PARAPLEX G-25 and G-40, PARAPLEX G-50 is a high molecular weight polymer that will withstand prolonged exposure to heat and sunlight, that will not migrate from your vinyl compounds, nor volatilize and leave behind brittle films and disgruntled customers.

HIGH DIVIDENDS are part of the PARAPLEX G-50 extraordinary life insurance plan. First, your laboratory tests will show G-50's

. . . extremely low volatility
. . . resistance to ultraviolet light
. . . outstanding resistance to heat in processing and in service
. . . resistance to extraction by water and oil
. . . lack of migration

Then, your production department will discover the resinous plasticizer's:

. . . unexcelled pigment wetting and grinding qualities
. . . outstanding stability in dispersion compounds
. . . good handling and processing characteristics despite its high molecular weight.

Finally, your customers will note what your tests have predicted, and dividends in the form of increased orders will come your way.

CHEMICALS FOR INDUSTRY

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ROHM & HAAS COMPANY
THE RESINOUS PRODUCTS DIVISION
Washington Square, Philadelphia 5, Pa.
The Resinous Products Division was formerly The Resinous Products & Chemical Company

Table I.—Bearing Strengths of Thermoplastic Materials

Specimen No.	*Material*	*Average thickness*	*Average yield point (0.2% set)*
		in.	*p.s.i.*
B-109-A	Cellulose acetate	0.130	4,020
CX-5480	Cellulose acetate	0.502	3,950
C-7517	Cellulose acetate	0.132	3,880
CX-5484	Cellulose acetate	0.527	1,825
EX-5485	Ethyl cellulose	0.500	3,000
J-4	Polymethyl methacrylate	0.496	8,600
K-8	Polymethyl methacrylate	0.215	5,970
BD-1	Polyvinylidene chloride	0.498	3,000
VS-5300	Polyvinyl chloride acetate	0.150	9,370

Baldwin-Southwark hydraulic testing machine using the low or 6000-lb range. Since this was a hydraulic machine, the rate of travel of the cross-head could not be controlled as with a screw-type machine. Differences in the rate of travel may have been partially the reason for the differences in the shape of the curves near the yield point as all of the specimens tested were subject to considerable creep at high loads.

Results

The yield point in these tests was determined by plotting deflection against stress and noting the stress at the point where the set became 0.2% of the bearing pin diameter. Typical curves for the materials studied are shown in Figs. 4 to 8, inclusive.

The bearing strengths of the various plastics as determined with a ½-in. diameter pin are shown in Table I.

Metallizing Non-metallics

(*Continued from page* 87)

for establishing electrical contacts on non-metallics; as means for bleeding off electrostatic charges; etc.

D) Tools. The metallizing of non-metallic molds aids the heat conductivity and the release of materials which are shaped by these molds. Increasing utilization will soon be evident industrially.

With a more complete understanding of metallizing processes, the plastics industry will find increasing applications as well as enhanced appearances from these methods.

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INTERPRETATIONS OF THE CURRENT NEWS

By R. L. VAN BOSKIRK

Higher heat resistant thermoplastic

AMONG the significant papers presented at the Pacific Coast S.P.I. meeting was that by W. C. Goggin and G. B. Thayer of The Dow Chemical Co., who not only pointed out the improvements made in polystyrene molding powder in the past few years, but called particular attention to the company's new high heat resistant resin to be made available soon in limited quantities under the name of Dow Styron 671. It is a distinctly new plastic based largely on styrene.

Most outstanding property of Styron 671 is, of course, its high heat distortion. Measurements by A.S.T.M. method and a variety of other non-standard methods indicate its heat distortion to be above that of other polystyrene-like products now commercially available. Practical heat resistance tests of measuring cups show almost no distortion in a 30-min. boiling test. Coffee cups showed no apparent effect after 30 min. of boiling or two 15-min. cycles of boiling. There were very slight surface changes after six 5-min. cycles.

Practical test—It has been found that one of the most suitable tests for housewares and toys is a practical heat distortion test consisting of immersing the molding in a liquid bath and increasing the temperature 2° F. for every step of the test. The molding is immersed for at least 2 min. depending on the section thickness. It is then removed and checked for distortion. Sometimes templets are used to obtain an accurate check. When the first visible distortion is noted, the temperature indicated is considered the practical heat distortion.

With Styron 671 under such tests, measuring cups showed a practical heat distortion of around 215° F. Drinking mugs showed about 232° F.; bath tub toys, 226° F.; coffee cups, 220° F. By way of comparison with Styron 683, Dow's current high heat-resistant polystyrene, coffee cups showed a practical heat distortion of 208° F. Physical properties other than heat distortion of Styron 671 are equivalent to or better than general-purpose Styron.

The relatively high heat distortion of Styron 671 would indicate that it might be recommended for use in applications involving boiling. In spite of the fact that its heat distortion test results have proved to be higher than any comparable commercial material, according to Mr. Goggin, it cannot be guaranteed as being boilable or even recommended for prolonged or repeated boiling. Laboratory tests have shown that if the molded piece is highly strained, it is almost impossible to prevent some distortion, surface checking, or crazing on prolonged boiling. On the other hand, if a similar piece is free of strains, it is nearly as difficult to obtain any distortion on boiling.

Molding skill needed—Here is where the molders' skill can come into play. Those molders whose dies are carefully designed and whose work is carefully done will end up with a far better product when using Styron 671 than molders who do careless, slip-shod work. Before the molder advertises his product as "boilable," he should mold the product and run extensive boiling tests on it in order to satisfy himself that it will stand up in service.

Styron 671 can be molded in a variety of commercial molds with conventional equipment. One of the most important points involved is that of high mold temperatures: 190 to 210° F. has been found to be optimum. This is a requisite for good weld strength and reduction of molding strains. In some cases molding of very large area pieces on a machine of limited heat capacity may present difficulties. The high temperatures required to plasticize the material may be difficult if the heating capacity of the cylinder is not adequate.

Plastics in lighting

THE steady advance of extruded, formed, and molded fixture components in the fluorescent lighting field was emphasized in numerous manufacturers' displays at the Third International Lighting Exposition and Conference, held March 29, 30 and 31 at the Stevens Hotel, Chicago, Ill.

From the volume standpoint, polystyrene appears to be the favored plastic material, its most important applications being in the form of extruded sections for side panels and complete fluorescent tube enclosures. Its light weight, excellent optical properties, and freedom from breakage in shipment have led many manufacturers to specify it as a replacement for the heavier glass panels. Many of the fixtures shown were equipped with polystyrene louvers.

Formed acrylic sheeting was used in some of the other fluorescent fixtures exhibited at the show. Louvers of vinyl strips were also displayed by one company.

The newest plastic material to make its bow in this field is a ribbed polyester laminate produced by U. S. Rubber Co., which is employed in a light diffuser in a number of fixtures shown by Markstone Mfg. Co., Chicago, Ill.

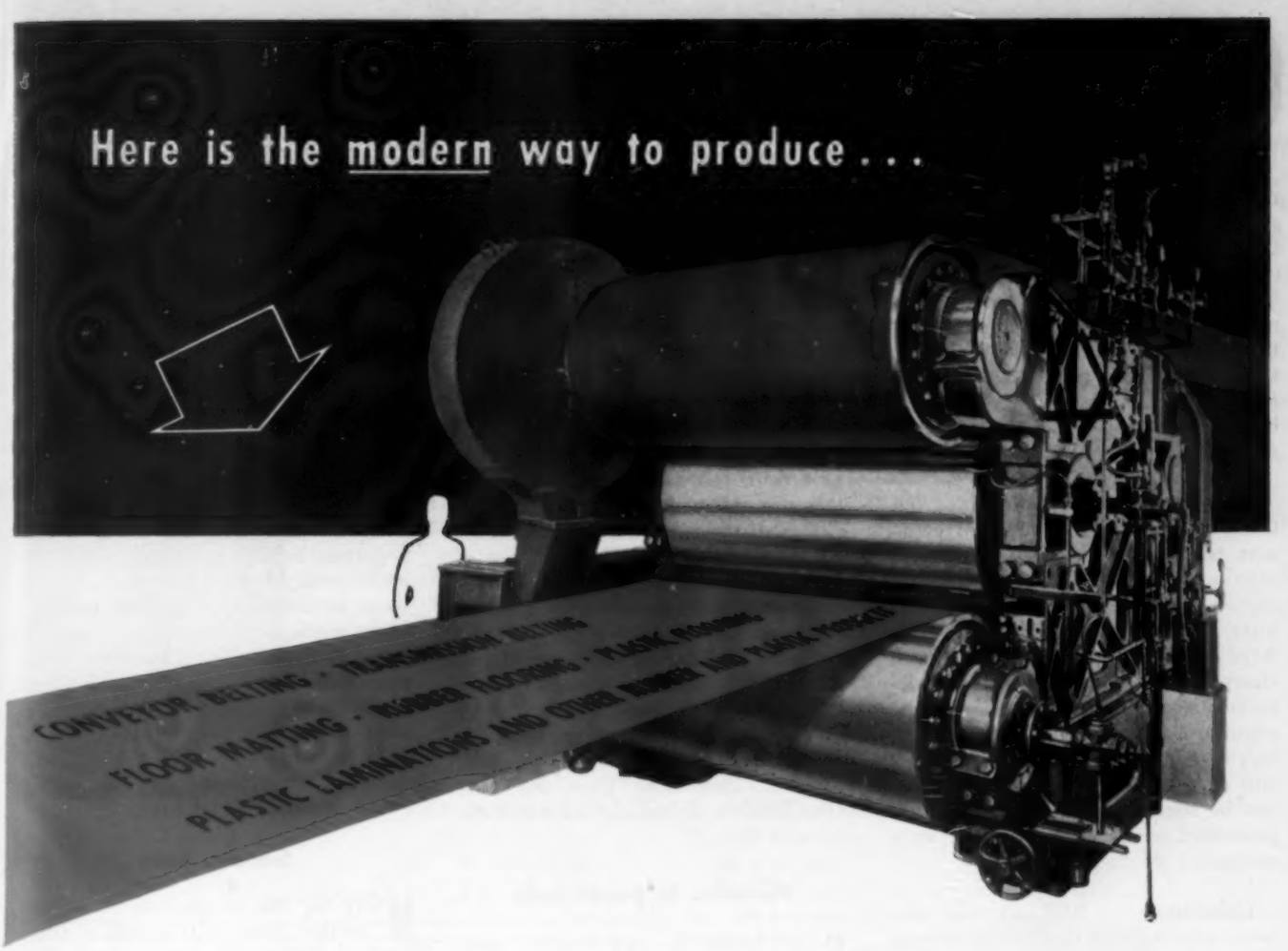
F. W. Tetzlaff, assistant sales manager, Rohm & Haas Co., spoke on "Plastics, the New Look in Lighting," in connection with the conference program.

Vinyl plastisol and blends

CARLOAD lots of Geon Paste Resin 121 are now available at 37¢ per lb., in comparison to a previous carload price of 40¢ per lb., according to an announcement by B. F. Goodrich Chemical Co., Cleveland, Ohio. Used in both plastisol and organosol formulations, Geon Resin 121 is especially adaptable to the former process, which is essentially a dispersion of resin in plasticizer without volatile organic liquids; no solvent or diluent is needed as is the case with organosols. Films up to 25 mils in thickness can be produced on a fabric with this paste or plastisol with only two passes on the coating machine. Furthermore, the use of a plastisol assures safer operations because of the absence of toxic and flammable solvents.

There has come to be an intensive interest in this comparatively new

*Reg. U. S. Pat. Office.



This machine, the ROTOCURE,* has a number of advantages where the run of any one size or type of materials is great enough. For example:

1 Continuous operation increases production by eliminating interruptions for opening, unloading, loading and closing.

2 Where material is cured in long lengths, double-cure around the overlap area, necking and non-uniform stretch are avoided.

3 Less floor space is required.

4 The work area can be kept cleaner and free from water which is common in belt press pits.

Cost comparisons indicate that where manufacturing conditions favor the use of the ROTOCURE, this machine, on some products, can save up to nearly 50 per cent of present production costs.

A Farrel-Birmingham engineer will be glad to discuss with you the possibilities of the machine for your particular conditions. A request for an appointment, or for further details by mail, will involve no obligation.

FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONNECTICUT

Plants: Ansonia and Derby, Conn.; Buffalo, N. Y.
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FB-508

* The ROTOCURE is a patented machine built under license from Boston Woven Hose & Rubber Co.

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material, and some authorities insist that it will eventually make plastisol coating competitive with the calendering process. Among the advantages of paste coating are minimization of fabric shrinkage, distortion, strain, and resin heat history. Glass fibers and paper can also be coated with this material, and it can be used for dip coating and slush molding.

Powdered rubber — Goodrich Chemical has also announced commercial production of Hycar OR-15 nitrile rubber in powder form, designed especially for mill and Banbury blending with phenolic resins. Says J. R. Hoover, vice-president in charge of sales: "The first finely divided elastomeric material to be commercially available in this country, Hycar OR-15 powder is the result of a need for a material which can be successfully dry blended and processed in an internal mixer in a minimum operation cycle."

Upholstery — Still another announcement coming from Goodrich Chemical deals with a new upholstery material for outdoor furniture made by Cotan Corp., Newark 5, N. J. Thousands of gliders have been covered with this new upholstery, a fabric coated with a blend of Geon and Hycar nitrile rubber.

Ed. Note: There has been little public discussion of the development of vinyl-nitrile rubber compounds since the initial publicity two years ago. Queries directed to several sources reveal that a great many items are being produced, or are well along in development, using either polyblend or the nitrile-vinyl combination. Upholstery—the one mentioned above, and others—garden hose, flooring, and even comparatively thin film for such use as draperies, are being developed and will soon be on the market if not already available.

Improved polyester

AN improved polyester resin that is nearly water white has been announced by the United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y. It is known as Vibrin 108, and company spokesmen claim it is superior to all other Vibrins, which have a yellowish cast. The new resin is reported to approach the clarity of glass more than any other resin of similar type. The uncured resin has a specific gravity of 1.12; the cured resin a s.g. of 1.25.

Sand core binding

DEVELOPED for binding foundry sand cores, a new resin has been introduced by American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y., under the trade name of Cycor 151. It is a thermosetting resin especially prepared as a water resistant foundry core binder and contains no filler or additives of any kind. It will produce water resistant cores which withstand high humidity and long lay-overs in molds. The resin gives foundries 33 to 50% faster baking time than the old-time binders at baking temperatures of only 350° F.

Phenolic in paper pulp

SUCCESSFUL commercial production of laminating and molding sheet stock and molded pulp products using liquid phenolic resin for direct addition to pulp in paper-mill beaters has been announced by the Snyder Chemical Corp., Bethel, Conn. This material can be used in either open or closed systems, and does not in any way complicate regular paper-making operations. It does not become tacky nor does it clog fine screens or felts.

The liquid resin, Synco 721, is also compatible with acrylonitrile-butadiene copolymers, such as Hycar latices. Extremely high impact moldings may be produced by the incorporation of 2 to 10% latex in the beater. Such molding and laminating compounds also have greatly improved flow and improved resistance to hot oil and abrasion. In addition, the modified compounds are fast curing and possess excellent surface finish. They have outstanding cold-punching and post-forming properties, according to company officers.

Molding pressures and temperatures are in the usual range for phenolic compounds of similar resin content.

A special grade, Synco 721-RB, is said to be highly effective in improving the bond between synthetic rubbers and cellulosic fibers. High wet-strength papers, retaining over 90% strength in the wet condition, are possible using 721-RB and GR-S. These new resins are competitive price-wise with ordinary liquid phenolic resins.

Quilted vinyl

STITCHLESS quilted vinyl for upholstery, manufactured by the Jason Corp., Hoboken, N. J., is now being merchandised nationally through department stores with directions for installation. The material, called Sealtuft, was described in our November, 1948 issue.

Suggested applications for Sealtuft are illustrated in the merchandising program and include its use for valences, table tops, headboards on beds, vanity benches, modern living room furniture, desk panels, powder room walls, or as a wainscoting for game rooms or dens. The material is available in 54 in. width, retailing at about $5.00 per yard. It is also available in cut-to-size squares about 17¾ in. square in 10 colors for individual chair seats. These pieces retail at about $1.00 each.

Garden hose

HOW far the vinyls can go in the garden hose field is still a subject of dispute in both the plastics and rubber industries. The estimated figures for 1948 indicate that the vinyls have a long way to go before they take over the field, for it is claimed that no more than 25,000,000 ft. of vinyl garden hose were produced, against a minimum of 220,000,000 ft. of rubber hose.

However, even the rubber people admit that the time is coming when vinyl will take over in this field, except in the cheapest grades, because of its utility, eye appeal, and light weight. Some present prices are as follows: Sears Roebuck; plastic hose, $7.95 per 50 ft.; green rubber (5 yr. guarantee), $4.98; red rubber (10 yr. guarantee), $8.25. Macy's; two-ply red rubber, $4.49 per 50 ft.; three-ply, $5.98; five-ply green rubber, $8.49; plastic hose, two different brands, one of which is 50 ft. for $5.98, and the other, 75 ft. for $11.98.

Sales pattern?

THE sales trend of some types of plastics materials can be frequently followed by watching the sales volume of finished products using plastic parts. Take vacuum cleaners, for example. Total factory sales in February were 241,267 units

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—5.5% over January, and 22.5% below February 1948. The pattern is similar to many other appliances—big drop from 1948 but an encouraging increase in February over January.

Sales are almost certain to slow down from 1947 and 1948, but volume is expected to be ahead of pre-war days — average monthly production in 1940 was 160,000.

Vacuum cleaners were among the first of the large size electrical appliances to feel the market impact when customers felt they could begin to get choosy. Vacuum cleaners use from 1 to 5 lb. of plastic per unit, depending upon the model.

Goodrich plasticizers

SPECULATION as to just what type of plasticizer would be forthcoming from the new B. F. Goodrich Chemical Co. plant has been ended by the announcement that its first Good-rite plasticizer to be marketed would be dioctyl phthalate to be known as GP 261. The published properties of GP 261 are practically identical to those of other DOP plasticizers now on the market. Full scale production began in April.

The scarcity of DOP should now be ended. In addition to Goodrich and the two original producers, Carbide and Carbon and Ohio-Apex, American Cyanamid has entered the field; Tennessee Eastman produces in small quantity; and the rumor won't die that Monsanto is showing more than casual interest. Other phthalic anhydride producers are also considering the wisdom of entering the field.

Thermoplastic for extrusion

FORMVAR, polyvinyl formal, is now available in extrusion grade, according to the manufacturer, Shawinigan Products Corp., 350 Fifth Ave., New York 1, N. Y. Its tensile strength is said to be 12,000 p.s.i. at 20° C. Because of this inherent toughness, it has heretofore been applied only from solution, but new extrusion equipment and techniques now make possible the production of tubes, rods, sheets, etc.

Formvar is said to have excellent warp resistance, abrasion resistance, and a high heat distortion point. It is completely resistant to oils, gasoline, aliphatic hydrocarbons, fats, waxes, and is also resistant to alkalies, according to company information, which suggests its use for automotive parts, machine parts, gasoline and oil lines, and other industrial applications.

Plastics college course

FACTORY and laboratory technicians, retailers, buyers, and others in merchandising and manufacturing, have completed the first half of a two-semester course in plastics at the University of Toledo under the over-all supervision of Dr. Joseph S. Hicks, lecturer in chemistry and author of "Low-Pressure Laminating of Plastics."

The course was created by and is under the sponsorship of the Toledo Section of the Society of Plastics Engineers. One important purpose is further to educate large-scale buyers of plastics materials to the practical possibilities and uses of plastics. Prominent leaders in the industry comprised the panel of outside lecturers for the first semester.

Cellulosics promotion

BEGINNING with the March issue, the bulletin *Cellulosic Plastics* put out by the Hercules Powder Co., is being published in a new format at regular quarterly intervals. It is designed to bring its readers the up-to-date story of the continuing development of the cellulose-based plastics. It illustrates and describes present applications and suggested product applications, and also discusses testing and technical assistance facilities available from Hercules.

Comfort chairs

SEARS Roebuck is reported to be first in the retail field with the new all plastic chair developed by Egmont Arens and manufactured by the General American Transportation Co. The chair, described in the November, 1948 issue of MODERN PLASTICS, is a low pressure laminate shell with fiber filler impregnated with a phenolic resin and designed to fit the complex curves of the body by a device called a Posture Meter which determines the points of greatest pressure in sitting and leaning.

As offered by Sears Roebuck, the body contour chair comes in maroon with steel legs and sells for $22.95. It can also be produced in a transparent polyester resin developed by the American Cyanamid Co. which permits the insertion of a decorative fabric in the mold to match drapes or carry out a decorator scheme.

Unusual use for vinyls

AN unusual use for vinyl film and sheeting was demonstrated last Holiday time when the Art Dept. of the Cranston, R. I., Public School System created a Christmas display in front of the City Hall, in which Respro, Inc.'s vinyl materials were found particularly applicable because of their color effect and ability to withstand wintry weather.

Costumes for all figures were made from vari-colored vinyl film and sheeting ranging from 0.004 to 0.021-in. gage. The women's dresses, some of the coats, and even the men's mittens were made from 0.004-in. gage film in various colors. Choir boys were all clothed in Resproid, and a panel background was covered with 0.004-in. gage opalescent blue.

Nylon zippers

ONE millon nylon zippers a month are being shipped by Waldes Kohinoor, Inc., according to publicity reports. The nylon zipper has passed heat tests of 360° F. and is not damaged by dry cleaning or laundering. Successful dyeing of nylon has probably contributed to the merchandising practicality of this item since it can now be furnished in all colors to match the garment to which it is sewn. At present it does not offer any price advantage over metal zippers.

Store displays

AS a result of the interest in mass displays of plastics and the demand for plastic products, the J. L. Hudson Co., Detroit, Mich., is now setting up a plastics shop in housewares. The company has stocked 32 different polystyrene items and places them in one display in order to get the benefit of a colorful exhibit.

This development is the result of a special display arranged for Hudson by The Dow Chemical Company during the store's annual Housewares Exposition. This is given during the same week as the Chicago

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National Housewares Show and has become so famous that most buyers go on from Chicago to see the special Hudson show.

Other department and chain stores throughout the country have been watching the Hudson experiment or have been trying the same thing in one form or another. Bloomingdale's New York, has an extensive plastics department; Joseph Horne Co., Pittsburgh, Pa., has let it be known that it expects to follow the Hudson procedure.

Stores and molders are also experimenting with the possibility of making more extensive use of permanent, personal demonstrators for plastics displays in large stores of both the department and chain store types. Announcements along this line are expected momentarily.

More Plexene available

PLEXENE M, a modified polystyrene molding powder produced by Rohm and Haas Co., is now in full scale production after a long period of scarcity due to raw material shortages. Selling at 54¢ per lb. in 20,000 lb. lots and over, it is applicable for moldings that require high heat and chemical resistance and holds up remarkably well under outdoor exposure, according to company literature.

Improved flow

MAGNESOL, a new material for improving the flow of plastic molding compounds, has been placed on the market by Westvaco Chemical Div. of Food Machinery and Chemical Corp. This material is already in use by many of the large producers of phenolics and can also be used with other plastics.

The material is a specially prepared synthetic magnesium silicate of high bulk density. It is marketed as a fine, free-flowing white powder. Almost 100% of the product passes through a 325 mesh. Further information may be obtained by writing to the Westvaco Chemical Div., 405 Lexington Ave., New York 17, N. Y.

Silicone price reduction

THE fifth reduction in the price of DC Mold Release Emulsion No. 35 and No. 35A has been announced by the Dow Corning Corp., Midland, Mich. Expanding markets and increased production are expected to continue this lower cost trend, according to Dow Corning officials.

Polystyrene prices down

AT press time comes word that The Dow Chemical Co. has instituted a new price range for polystyrene by reducing the price 1¢ per lb. when the order is for 50,000 lb. or more. The number of price categories for crystal and standard polystrene has been reduced from seven to three, with a 1¢ per lb. differential between orders for 50,000 lb. or over; for 30,000 to 49,999 lb.; and for quantities of less than 30,000 pounds. The molder ordering 2000 lb. now buys his material for the same price as the man ordering 29,999 pounds. The reduction is based on a claim that the company can make a savings on distribution, heavier car loadings, and longer color runs in the large quantity orders.

When queried by phone, Monsanto spokesmen said their company would not institute a 50,000 lb. price unit but would probably alter its price structure at the 30,000 and 20,000 lb. levels. Bakelite has made no decision on a possible price change as we go to press, and officials of the Koppers Co. were not available for comment.

Merchandising prize

ELASTRON clothesline, manufactured by Industrial Synthetics Corp., 225 North Ave., Garwood, N. J., has been awarded first prize in the Hardware and Household Div. for the outstanding package of the year by *Variety Merchandiser*.

COMPANY NEWS

Premium Plastics, Inc., has opened a plastics plant in Verona, Ohio, for the creation and production of tailor-made plastics premiums. Facilities consist of 15,000 sq. ft. of floor space, with injection press capacity from 4 to 32 ounces. George F. Waite, president and sales manager, was formerly with Celanese Plastics Corp. as district manager.

Bralson Manufacturing Co. has moved from 1234 Vine St. to 28 S. Bank St., Philadelphia 6, Pa., where it will continue to manufacture Glo-On luminous plastic letters and maintain its facilities for creative design, product development, experimental model work, complete tool and jig service, and consultation on fabricating techniques and processes in the plastics field. Theodore Rothschild, formerly of Rothco Products in Philadelphia, will be in charge of production.

International Paper Co. has announced plans for a new $20,000,000 rayon pulp mill at Natchez, Miss. Scheduled for completion early in 1950, the new mill will have an annual capacity of 100,000 tons of dissolving pulp for use by manufacturers of rayon yarns, cellophane, plastics, and allied products. It is the first mill specifically designed for producing such pulps from hardwoods by the sulphate process, according to company officials.

Rockford Machine Tool Co., Rockford, Ill., is offering a special custom molding service for thermosetting parts up to 16 oz. in weight. Molding is done on the Rockford Hy-Jector 8- and 16-oz. machines which perform automatically the three functions of forming plastic powder into preform pellets; electronically preheating of the preforms; and injecting them into the molds.

This unusual service on the part of a machine manufacturer is proposed to offer a substantial piece price saving in quantity production of parts within the 16-oz. weight limit of the machine and also to demonstrate to molding shops in concrete form the unusual advantages of the Rockford Hy-Jector.

J. O. Reinecke, 720 N. Michigan Ave., Chicago, Ill., has appointed four staff members, including three industrial designers, as associates in the product design firm, and has reported a change in the firm's name to J. O. Reinecke and Associates. The three designers elevated to the position of associate are John W. Hauser, G. Harold Hart, and Joseph A. Hill. Jack B. Knight, business director, also was appointed an associate.

Vacuum Metalizing Corp., Long Island City, N. Y., has installed the first of four of the largest vacuum coaters ever built for plastic coating, according to Harold W. Mesberg, former executive vice-president of the Metaplast Co., who heads the

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new organization. The balance of equipment scheduled for 1949 will bring the total cost of plant and equipment to $175,000.

The large scale production unit is expected to provide low-cost metal finishing of the highest quality on cellulose acetate, polystyrene, and compression molded plastics.

Industrial Process Engineers, engineers, designers, and manufacturers of process plants and equipment, has moved from West New York, N. J., to a larger plant at 8 Lister Ave., Newark, N. J. Available from the company without charge is its new 12-page brochure describing examples of its Standard-Plus complete process units, process plants, and special process equipment.

Godfrey L. Cabot, Inc., has appointed Delacour-Gorrie, Ltd., 880 Bay St., Toronto, Ont., as its exclusive representative for the sale of carbon black and pine distillates throughout Canada.

Goodyear Tire and Rubber Co. has announced the appointments of J. A. Weatherford as a special sales representative of the Chemical Div. with headquarters at Chicago, Ill., and A. E. Polson as representative of that division with headquarters in Akron, Ohio.

Monsanto Chemical Co. has announced the appointment of Robert M. Morris, formerly assistant plant manager of its Texas City plant, as manager of the phenolics plant at Springfield, Mass.

Vitex Plastics, 1265 Broadway, New York 1, N. Y., has developed a laminating and combining process primarily intended to laminate acetate or vinyl films to all types of fabrics and to sheetings. By its process, a heavy or light weight acetate or vinyl film may be laminated to cotton sheeting of any thickness for upholstery or similar purposes.

Michigan Oven Co., 4544 Grand River Ave., Detroit 8, Mich., was recently organized to design, fabricate, and distribute industrial ovens of all types for operating temperatures to 1100° F. Officers include R. J. Ruff, president; E. C. Harrington, vice-president and treasurer; and P. A. Meyer, secretary.

Novelty Bias Binding Co., 181 Spencer Ave., Chelsea 50, Mass., has announced that it is now stripping into narrow widths all types of extruded plastic sheet in continuous lengths.

General Electric Co. has appointed Alan T. Wolcott as manager of advertising and sales promotion and John A. Grove as manager of marketing research for its Chemical Dept.

Acryvin Corporation of America, 18-12 Astoria Blvd., Astoria 2, N. Y., has announced perfection of a new process for the manufacture of heavy pearlescent acrylic sheets, enabling the firm to manufacture sheets 3 ft. wide and 4 ft. long, ranging from ½ to 1½ in. in thickness. Available in eight different colors, the sheets will be sold in the fields of building construction, furniture, store and home fixtures, and other related industries.

The Carborundum Co., Niagara Falls, N. Y., has announced the resignation of F. H. Appenrodt, office manager of the Pittsburgh, Pa., district sales office. He is succeeded by H. P. Erbe, formerly Cleveland, Ohio district sales office manager. R. L. Heimstadt, of the Detroit, Mich., sales office, has been promoted to succeed Mr. Erbe.

Shaw Insulator Co., Irvington, N. J., has announced the following organizational changes: Clarence W. Coe, president; J. Harry DuBois, vice-president; Stanford H. Shaw, secretary; and William R. Hopkins, controller.

Lea Manufacturing Co. of Canada, Ltd., 370 Victoria St., Toronto 2, Ont., has been formed to manufacture and distribute the line of Lea polishing, buffing, and burring compositions. Production in the Canadian plant is under the guidance of the Lea Technical Staff of The Lea Manufacturing Co., Waterbury, Conn.

Officers of the new company include Dr. Henry L. Kellner, president; Earle W. Couch, vice-president; and Kergan Wells, secretary and general manager.

Resin Industries, Santa Barbara, Calif., has opened its new plant designed and built for the manufacture of vinyl tubing and stripping. The company now manufactures a vinyl garden hose called Resinite and a clothes line coated with the same vinyl material.

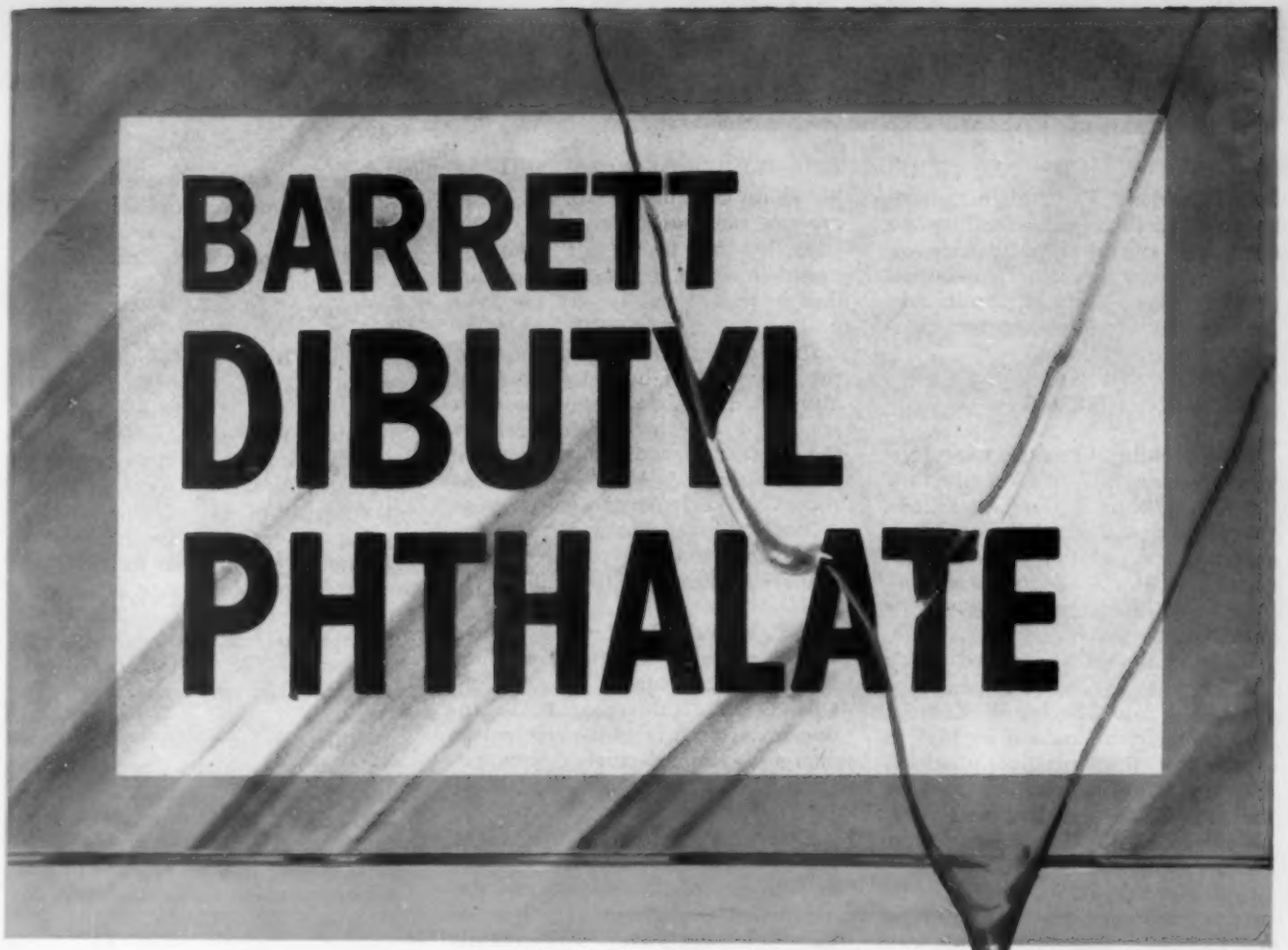
J. Arthur Deakin and Son, 182 Sigourney St., Brooklyn 31, N. Y., has been appointed by George H. Alexander Machinery, Ltd., of Birmingham, Eng., as its exclusive representative in the New England and Middle Atlantic States to handle its complete line of die sinking machines, standard engraving machinery and allied equipment.

Goodyear Tire and Rubber Co., Akron, Ohio, has announced that managers of Pliofilm sales in the following sales offices have been made district managers in charge of sales activities in Airfoam, vinyl films, and the Builders' Supplies and Flooring lines, as well as Pliofilm: W. J. O'Keefe, New York; R. H. Kilgore, Cleveland; T. D. Strickland, Atlanta; R. T. Huffman, Dallas; A. E. Grundy, Los Angeles; and J. B. Post, Chicago.

Donald E. Neese has been appointed New York district sales manager for the firm's Chemical Div., and John W. Bear has been appointed to a corresponding post in Philadelphia.

Wilross Products Co., 20 Fourth Ave., Hawthorne, N. J., has announced a new resinous coating for paper which is claimed to have higher gloss per equivalent film thickness than the general run of commercial coatings. It is flexible, will adhere not only to plain or printed paper stock, but to glassine, cellulose acetate, cellophane, and most metallic foils. The coating dries by solvent evaporation, and there is no blocking. It can be heat sealed at temperatures of 250 to 275° F. Specific colors can be furnished to meet requirements.

Acme Laminating and Plastics Co., Inc., has elected the following new officers: M. C. Serling, president; M. Berke, secretary-treasurer; J. Farber, vice-president; and J. D. Keiswetter, vice-president in charge of printing on plastics. The company has recently moved from its Highland Park, Mich., address to a new and larger plant at 1315 E. Eight



...A SUPERIOR MODIFYING AGENT AND PLASTICIZER OF EXCELLENT COLOR AND LOW ODOR

Appearance	Oily, water-white liquid
Odor	Substantially none
Acidity (as Phthalic Acid)	0.01% by weight max.
Specific Gravity 20/20°C.	1.047-1.049
Assay (ester content)	Min. 99% by weight
Distillation @ 5mm Hg, °C.	173-177
Refractive Index @ 20°C.	1.4910
Viscosity—centipoises	
@ 5°C.	43.9
@ 25°C.	16.2
@ 50°C.	6.7
Weight per gallon	8.75 lbs.

Containers: 50-55 gal. one-way steel barrels

Barrett dibutyl phthalate is soluble in or miscible with the common organic solvents and diluents, but is practically insoluble in water. It is compatible with most lacquer resins and has a high plasticizing efficiency for nitrocellulose.

It is one of the most widely used plasticizers for nitrocellulose lacquers and cements and is extensively used with synthetic resins and rubbers. Recommended as a plasticizer to impart good low temperature properties to rubber stocks.

Its excellent color and low odor have served to promote its use in such special products as finger-nail lacquers and paper coatings.

BARRETT* CHEMICALS AVAILABLE TO THE PLASTICS INDUSTRY

Dibutyl Phthalate
"ELASTEX" DCHP Plasticizer
"ELASTEX" 10 P Plasticizer
"ELASTEX" 50 B Plasticizer
Phthalic Anhydride
Phenol
Cresols
Cresylic Acids
Toluol

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.
In Canada: The Barrett Company, Ltd., 5551 St. Hubert St., Montreal, Que.

Barrett*

*Reg. U. S. Pat. Off.

THE PLASTISCOPE

Mile Rd., Hazel Park, Mich., where improved facilities and added equipment will enable them to increase their output of plastic lamination, printing on rigid sheet plastic, and the manufacture of transparent containers and envelopes.

PERSONAL NEWS

B. Franklin Conner, executive vice-president of Colt's Manufacturing Co., Hartford, Conn., was advanced to president of the company at a meeting of the board of directors in March. He succeeds Graham H. Anthony, who was named chairman of the board.

Mr. Conner, who directed Colt's Plastics Div. for many years, is a son of the late Charles W. Conner, who came from England in 1857 to found the first plastics plant in America at Ashtabula, Ohio, where the new Colt's president was born. He joined Colt's 24 years ago after serving as president of Conner and Lapin, Newark, N. J., whose plastic product business was acquired by the Hartford firm.

Kenneth C. Culpert has been appointed manager of the Market Analysis Dept., Plaskon Div., Libbey-Owens-Ford Glass Co., Toledo, Ohio.

G. W. Naylor, formerly general manager of manufacturing for Sun Chemical Corp., has been named manager of the Development Section, Chemical Div. of Koppers Co., Inc., Pittsburgh, Pa.

Maurice Fleishman has joined the Goodyear Aircraft Corp., Akron, Ohio, as senior development engineer in the canopy and laminate division. Prior to joining Goodyear Aircraft, Mr. Fleishman was affiliated with Elmer E. Mills Corp. in Chicago, Ill., and with United States Rubber Co., Detroit, Mich.

George H. Kent has been appointed director of sales for E. F. Drew & Co., Inc., 15 E. 26th St., New York 10, N. Y. Mr. Kent was formerly director of sales-planning and general economics for the Koppers Co., Inc.

Louis C. Edgar, Jr., was recently elected to the presidency of the E. W. Bliss Co., builder of stamping presses, can machinery, and rolling mills. At 38, he is the youngest president since the founding of the firm 90 years ago.

Dr. George W. Ward, chairman of the Inorganic Chemistry Div. of Midwest Research Inst., has been appointed director of research of the Gustin-Bacon Manufacturing Co., Kansas City, Mo. Dr. Ward has supervised extensive research programs on glass fibers for Gustin-Bacon, in addition to surveys of natural resources of the Midwest.

J. P. Vederko has been appointed works manager of the Hydraulic Press Manufacturing Co., Mount Gilead, Ohio, succeeding E. J. McSweeny, formerly vice-president in charge of manufacturing, who resigned last February.

Samuel P. Zuccarelli has joined Nixon Nitration Works, Nixon, N. J., as manager of its research and development department. He has replaced Robert Linzer, who recently purchased his own electro-plating business.

Kenneth A. Wilson, formerly with Monsanto Chemical Co., has joined the Synvar Corp., Wilmington, Del. He will sell and service Synvar resin glues, urea, and phenolic in New York and Pennsylvania.

Chas. Kleiderer, technical director of Ideal Novelty and Toy Co., and well known in this industry as the control officer for plastics used in development of the famous proximity fuse, has resigned his position with Ideal. He has announced no plans for the future and is currently available as a consultant at his home, 68 Kingsbury Rd., Garden City, L. I., N. Y.

M. A. Self has been named president of the Bee Chemical Co., 13799 S. Avenue "O", Chicago 33, Ill., producers of Logoquant, Logolube, and other finishes and chemicals used by the plastics industry. He also continues in the capacity of sales manager of the firm.

Louis Cohen, formerly associated with Mirro-Plex, Inc., has formed his own organization under the name Elcone at 160 Fifth Ave., New York 10, N. Y. The firm does metallic finishing on all kinds of plastics in simulated gold, silver, and pastel colors.

John H. Clark, former general sales manager of the Plastics Div. of Monsanto Chemical Co., has joined Rogers Plastic Corp., North Wilbraham, Mass., as vice-president in charge of sales.

William R. Porter, formerly director of plastics molding materials sales for the Celanese Corp. of America, has been appointed sales manager of Stewart Hartshorn Co., 250 Fifth Ave., New York 1, N. Y., manufacturers of window shades, spring rollers, and coated fabrics. During the coming year the company will push merchandising plans particularly on Fyrban, a flame resistant shade cloth which it recently developed especially for institutional and industrial markets.

William J. Dunnican has resigned his position with the Chemical Div., Borden Co., 350 Madison Ave., New York, N. Y. He has made no announcement of his future plans beyond stating that he expects to take a short vacation at his residence, 352 Plymouth Road, Union, N. J.

Deceased

Clarence W. Gallagher, assistant sales manager, Reed-Prentice Corp., 52, died March 15 at his home in Worcester, Mass.

MEETINGS

April 28—Plastics Club of the U. S., 8:00 p. m., Benjamin Franklin Hall of the Advertising Club, 103 E. 35th St., New York, N. Y. Speaker, Robert Gruen, Gruen Associates, on "Aspects of Plastics in Packaging."

May 2-4—Third Annual National Meeting, Forest Products Research Society, Civic Auditorium, Grand Rapids, Mich. Open to non-members as well as members.

May 10-13—18th Annual National Packaging Exposition, Public Auditorium, Atlantic City, N. J.

May 26-27—Annual meeting, Society of The Plastics Industry, Edgewater Beach Hotel, Chicago, Ill.

June 12-15—27th Annual Conference of the National Industrial Advertisers Association, Hotel Statler, Buffalo, N. Y.

All classified advertisements payable in advance of publication Rates: $5.00 up to sixty words; enclosed in border, $10.00 per inch.

Classified Advertisements

For further information address Classified Advertising Department, MODERN PLASTICS, 122 East 42nd Street, New York 17, New York

MODERN PLASTICS reserves the right to accept, reject or censor classified copy.

EMPLOYMENT • BUSINESS OPPORTUNITIES • EQUIPMENT (USED OR RESALE ONLY)

FOR SALE: 100 Ton and 50 Ton Press; 250 Ton Southwark Hobbing Press; 300 Ton W. S. Press 24 x 20 Pla-Stokes Molding Press & Pumps; 300 Ton Dunning & Boschert Molding Press; 300 Ton W. S. New Hobbing tens; 175 Ton H. P. M. 30 x 30 Platens; 85 Ton Stewart Bolling 20 x 20 Platens With Electric Plates; 50 Ton 18" x 18" Elmes, With Electric Plates, Hand-pump Operated; 500 Ton Waterbury Farrel 3 Post Press; 800 Ton Waterbury Farrel 32" x 24" Platens; Stewart Bolling 50 Ton 14" x 14" Platens; 35 Ton Oilgear Shaft Straightener 84' Long Bed; Carver & Watson Stillman Lab. Presses; Hydro Pneumatic & other type Accumulators; Piston & Oil Pumps. Aaron Machinery Co., 45 Crosby St., N.Y.C.

HYDRAULIC PRESSES REBUILT to specifications for plastic items, industrial purposes and phonograph record presses, producing two per minute. We have in the used equipment (1) Baldwin-Southwark 8" x 8 ft. stroke, 2000# W. P. weighted accumulator $1000, (1) French Oil 3" x 42" stroke, 2500# W. P. weighted accumulator, $600, (1) 600 ton, 40 x 48, 18" ram, 36" stroke, 12 ft. daylight $2200, (1) 400 ton, 24 x 48, 18" ram, 24" stroke, $1800, (1) 400 ton, 22 x 30, 10" ram, 18" stroke, 36" daylight $1500, (2) 150 ton, 42 x 46, 12" ram, 36" stroke, 60" daylight $900 each, (2) 30 ton, 11½ x 11½, 10" double acting ram, 10" stroke, 3 post downward acting self-contained $1000 each, (1) 400 ton Hobbing Press, 20 x 24, 16" ram, 12" stroke, 13½" daylight complete with 2 plunger vertical high and low pressure pump, V belt drive wth 2 H. P. motor, $2375.00, (3) 24 x 24, 250 ton Southwark Presses with push-backs, 15½" ram, 15" stroke, 33" daylight $1450 each. Hydraulic Sal-Press Co., Inc., 386-90 Warren Street, Brooklyn 2, New York.

LARGE EASTERN PLASTICS manufacturer has opening for technically trained young man to head sales development work on plastic compounds for extrusion, injection and compression molding. Salary dependent on knowledge of plastic field and experience in production of molded products. Reply Box C861, Modern Plastics.

CHAIN STORE SPECIALISTS

Sell your products to volume accounts through an established specialized sales force. Our merchandising, marketing and product development service assures maximum initial and continued volume sales. Reply Box C868, Modern Plastics.

FOR SALE—1—Watson Stillman Hydro-Pneumatic High and Low Pressure Accumulator System, complete; 1—Van Dorn Experimental Injection Molding Machine; Other Injection Molders up to 22 oz; 2—150 Ton Semi-Automatic Self-Contained Hydraulic Presses; 1—Royle #½ Plastic Extruder 1¼" cylinder, other up to 8" cylinders; Two Roll Compounding Mills 6 x 12" up to 22 x 60"; Complete equipment for manufacture of molding powders. Send us your inquiries. CONSOLIDATED PRODUCTS CO. INC., 13-14 Park Row, New York 7, N. Y.

(15) AUTOMATIC UNITS—Hydraulic Baldwin Southwark 50 ton automatic tilting head press serial #45580. Taylor Flex-O-Timer No. 179RJ311, 23 x 40 steam plate and double shelf table, (1) 1¼" hydraulic high and low air diaphragm valve, (2) ¾" hydraulic air diaphragm valves, (1) Vickers high and low pumping unit, 5 H.P. motor, regulating valves, 70 gallon tank, and cooling system. Price $1800.00. HYDRAULIC SAL-PRESS CO., INC., 386-390 Warren Street, Brooklyn, N. Y.

FOR SALE: Farrell 15" x 36", 2 Roll Rubber Mill, New Lab. 6" x 12"; other sizes 30" to 84"; Royle #2 Perfected Extruder; 500 ton Hydr. Molding Press 42" x 48"; Field 500 ton 25" x 30"; Francis 200 tons; 24" x 18". Albert 100 Ton, 2 opening, 24" x 24". Also presses 20 to 250 tons from 12" x 12" to 36" x 36" & 40 ton Bronchng Press. Watson-Stillman Hor. 4 plgr. 1" x 2" x4" H. & L. Pressure Pumps; HPM 1¾" x 6"; vertical triplex 10 GPM 2700 lbs.; 7 Hydr. Oil Pumps, Vickers, Oilgear, Northern, etc., Elmes 1" x 4" & 1½" x 4" hor. 4 plgr. 5 to 8 GPM 4500 lbs. & 5500 lbs., Elmes 2" x 6" hor. 30 GPM, 2500 PSI.; Rumsey 4½" x 8" vert. Triplex 65 GPM 900 lbs.; Elmes 2½" x 4" hor. 17 GPM 850 lbs.; Hydr. Steam Pumps; Low Pressure Pumps 150 to 600 lbs. Hydr. Accum.; Stokes type 200 Automatic Molding Press, Stokes Rotary Preform Tablet Machines 1-3/16", 1¼" and ⅝", also single punch; Injection Molding Machines 2 oz. to 12 oz.; Baker Perkins Jacketed Mixers 200, 100, 50, 20, 9 & 0.7 guls. capacity; New and used Rotary Cutters; Rubber Mills; Calenders, Banbury Mixers, etc.; Heavy duty Mixers; Grinders; Pulverizers; Gas Boilers, etc. PARTIAL LISTING. We BUY YOUR USED MACHINERY. STEIN EQUIPMENT CO., 90 WEST ST., N. Y. 6, N. Y. WOrth 2,5745.

WANTED TO PURCHASE
all types of plastic scrap, particularly
VINYL & POLYETHYLENE
INDUSTRIAL BURLAP & TEXTILE COMPANY
1128 Spring Street, Elizabeth, New Jersey.

LINES WANTED
Sales representative, New York, specializing in 5¢ to $1.00 items suitable for big Chain Stores, desires to contact manufacturers of plastic specialties, housewares, toys, notions, stationery or novelties. I have over 20 years experience, an extensive following, and can market your products in volume. Commission basis. Reply Box C867, Modern Plastics.

SAVE WITH GUARANTEED REBUILT EQUIPMENT-HYDRAULIC PRESSES; 30" x 30", 20" ram, 1000 tons, 36" x 36", 19" ram, 425 tons; 30" x 30", 17" dia. ram, 340 tons, 24" x 24", 18" ram, 382 tons; 42" x 42", 16" ram, 250 tons; 30" x 30", 16" ram, 300 tons; 36" x 52", 14" ram, 385 tons; 24" x 24", 14" ram, 192 tons; 36" x 36", 12" ram, 141 tons; 24" x 24", 12" ram, 141 tons; 24" x 26" 10" ram, 118 tons; 20" x 20", 10" ram, 118 tons; 19" x 24", 10" rams, 78 tons; 22" x 15", 8" rams, 75 ton, 15" x 15", 8" ram, 75 tons; 12" x 12", 7½" ram, 50 tons; 12" x 12", 6½" ram, 42 tons; 8" x 9½", 4½" ram, 20 tons; 16" x 16", 3½" ram, 12 tons; PUMPS; NEW DUAL PUMPING UNITS, all sizes, Worthington Triplex 12 gal. 2200#; 4 plunger, 6 gal. 2000#; Watson Stillman Duplex Box type 1 gal. 2500#, Worthington 1 gal. 10000#; NEW LABORATORY 6" x 12" M.D. MILLS; Thropp 16" x 40" M. D. MILL; Extruders; Plastic, NRM size 1½ and 2½ Units; Preform Machines; Stokes R and T, Colton 5 and 5½ T; Mixers; Accumulators, Vulcanizers, etc. UNIVERSAL HYDRAULIC MACHINERY COMPANY, 285 Hudson St., New York 13, New York.

WANTED: PLASTIC Scrap or Rejects in any form. Cellulose Acetate, Butyrate, Polystyrene, Acrylic, Vinyl Resin, etc. Also wanted surplus lots of phenolic and urea molding materials. Custom grinding and magnetizing. Reply Box 318, Modern Plastics.

PLASTIC INJECTION MOLDING PRESS, 1 oz. Watson-Stillman complete with pump, push button electrical control, 2 H. P. three phase, 220 volt motors and Wheelco Indicating Heat Control. Purchased new 1947, used occasionally for experimental work and one short trial production run. Now operating in owners' plant. Replacement cost $1300. Price $895. HAZELLE'S MARIONETTES, 905 East 10th Street, Kansas City 6, Missouri.

SALES ENGINEER WANTED
Established custom injection molding plant in Chicago area desirous of obtaining sales representation industrial areas of Detroit, Cleveland, Buffalo, New York, Philadelphia, St. Louis and Indianapolis. Have established accounts in some territories now. Prefer experienced plastic man or salesman with contacts and engineering background. Excellent factory cooperation. Complete tool room, engineering and designing. Also assembly, painting and finishing. Machines up to 40 oz. capacity. Reply Box C873, Modern Plastics.

FOR SALE
Phenolic molding powder equipment for making 2000 lbs. phenolic molding powder per day including 100 gal. jacketed steel kettle complete with agitator, motor, gear reducer, pumps, vacuum ejector, reflux condenser, temperature and power recorders and controls, and quick opening valves. 3 hammer mills for grinding resin and sheeted material complete with cyclone separators, blowers and housing for cooling, and exhaust blowers and motors. Compressor, cooler, blower and duct. Ribbon type horizontal mixer, 600 lb. capacity, with damper and magnets. 2 sets 16 x 42" rolls with feeder, 50 H.P. motors, traps, steam regulators, reversing switch 80 cu. ft. vertical, rotating tumbling batch mixer with motor. For details contact Manager, General Research, Owens-Illinois Glass Company, 1700 N. Westwood, Toledo, Ohio.

FOR SALE 8-oz. injection molding machine and brand new injection type Molds. One 6-cavity combination special designed beautiful Soap-Box, one 6-cavity Soap-Dish, one 4-cavity novelty item and one 4-cavity tumbler Mold as well as several other molds. All Molds to fit the 8-ounce Reed-Prentice or any other injection machine. Molds are guaranteed brand new and in perfect working condition for immediate possession. Reply Box C775, Modern Plastics.

PLASTIC VINYL SCRAP — Bought and Sold. Flexible and Rigid. Sterns Plastic Products Co., 1686 Fulton St., Brooklyn 13, N. Y., PR 2-9215.

IF YOU HAVE GOOD HYDRAULIC PRESSES with modern pumping equipment for sale send me your specifications of same with photo, and I will see to it that you will get the best price available. Announcing: Hydraulic Sal-Press Co., Inc., formerly Sal's Press, located at 386-390 Warren St., Brooklyn, N. Y. Will continue to render its usual good service. 386-390 Warren Street, Brooklyn 2, New York.

WANTED BY INJECTION MOLDER
100,000 pounds of Reground Polystyrene. Will pay 15¢ per pound if material is suitable. Advise colors and quantity available. Reply Box C890 Modern Plastics.

SUPERVISING GRADUATE — Mechanical Engineer. 20 years experience in Plastics Industry. Production Management, Estimating, Sales, Compression, Transfer, Injection Molding and Mold design. Also familiar with Punch Press Works and tooling up for metal stampings. Toolroom experience. Reply Box C895, Modern Plastics.

(Please turn to page 156)

(Continued from page 154)

WANTED:—8-ounce Reed-Prentice or Watson-Stillman Injection molding Machine and several injection Molds such as Toys, Novelties, Houseware and other items. Molding Machine and Molds must be in excellent working conditions. State age of Machine and Molds, and if samples and complete shots are available. Prefer vicinity New York to facilitate inspection of Machine and Molds. Give lowest possible price for immediate action. Reply Box C888 Modern Plastics.

PLASTIC HIGH TEMPERATURE EXTRUDERS WANTED—3½" to 4½" Screw, Oil or Electric Heat. National Rubber Machinery or Modern Plastic make. Will also purchase take-off equipment and accessories. State age, size, make, condition, and price. JOSEPH DAVIS PLASTICS CO., Arlington, New Jersey.

FOR SALE—One 100 ton Watson-Stillman Semi-automatic Molding Press with self-contained pumping unit—excellent condition. Wanted—One 8 oz. Injection Molding Machine.

PLASTIC MACHINERY EXCHANGE
426 Essex Avenue Boonton, N. J.

PLANT LIQUIDATION
PRICED ACCORDINGLY

MILLS (4), Erie 60", Adamson 60", Farrell 48", Farrell 42", HYDRAULIC PRESS, 10 platen, 22" x 52", Mixers, Grinders, Cutters, Centrifuge, etc., etc. Above equipment complete with motors, switches, controls, ready to operate. Modern building available, sale or lease. Reply Box C902, Modern Plastics.

TECHNICAL EXECUTIVE, B.S. degree, age 31, married, presently employed, desires position with good opportunity for advancement. Nine years experience tool design, production and sales engineering in compression and transfer molding field, limited injection molding experience, excellent references, could be available on months notice. Reply Box C891, Modern Plastics.

MANUFACTURER LOCATED SMALL TOWN northern Pennsylvania has opening for young men in plastic design on small items. Knowledge of injection mold design and production experience preferred but not essential, design ability most important. Applicants should mention age, experience and salary expected. Reply Box C892, Modern Plastics.

WANTED: Automatic Button Broach Machine "Buttondex" or similar. Reply Box C893, Modern Plastics.

WANTED TO PURCHASE—used 4 ounce De Mattia injection molding machine. Also small scrap grinder. Price must be reasonable. Reply Box C894, Modern Plastics.

ACETATE SHEETS

.030 clear 20 x 50", brown 24 x 30". Very low price. Immediate delivery. ARISTOCRAT PLASTICS, INC., 55 Clarkson St., N.Y.C. WAtkins 4-4216.

MANUFACTURER: Wants small plastic spigot not over 1½" in length including threads and washer or die to make same. Prefer Styrene. Write full particulars. Reply Box C921, Modern Plastics.

PLEXIGLAS

.060, .080 Green #260, all masked. 9 x 20 x 36" 30¢ per ft. Immediate delivery. ARISTOCRAT PLASTICS, INC., 55 Clarkson St., N.Y.C. WAtkins 4-4216.

WANTED: 6 or 8 oz. Reed-Prentice, or equivalent; must be in perfect condition. Mail complete details to Devalera Manufacturers, 1948 Park Ave., New York 35, N. Y.

NOVELTY BOX DESIGN—Right available—for molder or manufacturer on royalty basis. Largest potential sales through department, gift or novelty stores. Design patent applied for. Reply Box C897, Modern Plastics.

FOR SALE

Two 16-oz. HPM—excellent condition—one new 1945, one new 1946; also one Reed-Prentice 10A-4, new 1946. All may be seen operating. Reply Box C896, Modern Plastics.

SCULPTOR DESIGNER and model-maker, having diversified background conceiving and creating originals for the plastics industry. Experience includes responsible positions in leading plastics toy and novelty companies. Specialist in animal and figure work, animated characterization, or realistic. Full, part-time, free-lance. Maurice Winters, 66 Jane Street, New York City 14. Tel. ORegon 5-2353.

YOUNG ENERGETIC PLASTIC EXTRUSION specialist, graduate engineer, thoroughly familiar all phases development and production, including die design and devising special equipment. Resourceful originator special processes. Now in charge extrusion department large firm. Available at reasonable notice. Reply Box C889, Modern Plastics.

FOR SALE: 6 and 8 oz. Reeds, 2, 4 and 7 oz. HPM Injection Presses. 1½" (new) and 2½" NRM oil heated Extruders. Ovens. Granulators, Tumblers. Temperature Circulators. 1 Apex auto. Printing machine. 20 to 100 tons Compress. Presses. 1—150 tons 24 x 24" Pl. self. cont. Compress. Press. 1 Kux 60A Preformpress. Justin Zenner, 833 W. Sheridan Road, Chicago 13, Ill.

WANTED: Resin impact testing machine and resin transverse testing machine. Reply Box C900, Modern Plastics.

FOR SALE—20,000 pounds virgin Dow Ethocel, formulation CR-H, color black. Material still in original sealed drums, kept under excellent storage conditions. Price and information on request. Reply Box C898, Modern Plastics.

WANTED: Self-contained molding presses; 300 ton, 200 ton. Also hand mold presses which operate by self-contained unit. Interested in a medium size preforming machine. All machinery must be in good condition. Please give full information and price. Reply Box C899, Modern Plastics.

WANTED: Small extrusion machine and laboratory size grinding mill. State price, make, and condition. Reply Box C901, Modern Plastics.

EXECUTIVE ASSISTANT OR ANY PROMISING POSITION in concern doing plastic molding in New Jersey area. Mechanical engineer, upper fifth of class—Stevens Tech. Will graduate in May from Harvard Graduate School of Business. Former naval officer, gets on well with people, good health. Resume available on request. Available for interview. Raymond G. Tuttle, 489 Innes Road, Wood-Ridge, N. J.

PEGS • SAWDUST
COMPOUND — MIXTURES

Kew Bee Kut compound mixtures now being produced. It has more cutting qualities than the ordinary grades.
Square Kut Pegs •••• Italian Pumice, fine and lump grades. Write for particulars. National Sawdust Co., Inc. 82 N. 6th St., Brooklyn 11, N. Y.

WANTED—Used Van Dorn H-200 hydraulic injection presses. Joseph R. Barzantni, 7219 Woodlawn Avenue, Chicago 37, Illinois.

FOR SALE—Because of process change—150 ton Hydraulic Press with 2—20" x 20" steam Platens. Upmoving 12" ram, 13" stroke 22" between strain rods. Can be used for record press or other compression moulding. Priced for quick sale. Reply Box C904, Modern Plastics.

EXTRUSION ENGINEER AVAILABLE SOON. Widely experienced. Capable of setting up and operating plastic plant. Thoroughly familiar in the production and development of thermoplastics such as irrigation tubes, packaging, shapes and fabrications. Prefer to locate in the South or West. Reply Box C903, Modern Plastics.

The following sheeting is offered subject to prior sale at reduced prices:—

NITRATE

Quantity Sheets	Gauge	Color No.	Color
47	95/1000"	200	Black
14	130/1000"	1190	Wine
11	100/1000"	2428	Verdal
247	15/1000"	18-C	Clear
112	15/1000"	200	Black
165	25/1000"	18	Clear
401	30/1000"	205	Clear
70	10/1000"	205	Clear
147	60/1000"	2264	Blue Transp.
140	60/1000"	2263	Red Transp.
56	130/1000"	3833	Briar
9	40/1000"	200	Black
16	95/1000"		White
14	120/1000"		White
25	130/1000"	24824	Rose-Wood
329	130/1000"	2264	Blue Transp.
416	130/1000"	2263	Red Transp.
603	130/1000"		Cherry-on-Crystal

ACETATE

Sheets			
355	30/1000"	C-389; 0-6891	Clear
8	40/1000"	C-389	Clear
134	10/1000"	C-300	Clear
181	20/1000"	19824	Black
150	15/1000"	20520TC	Clear
267	20/1000"	C-379	White

Reply Box C915, Modern Plastics.

PATENT RIGHTS for sale or License. Patent, 2,415,200, GROMMET SPINDLE. Pat. Feb. 4th, 1947. A moulded, all-plastic, grommet spindle for use in manually producing cotton string grommets which are essentials in ship building and repairing. Figures embossed on the ends of the spindles indicate the diameter of the spindle. Accurate measurements; flexible molding at low cost; international markets. Write, Morten B. Michelsen, Antonito, RFD 164, Colorado. (Group 37-31-32-30-81. Register No. 8,195.)

PRODUCT DESIGNER AVAILABLE—for responsible position. Full of ideas, can carry the design right through the model-making stage into the die-maker's hands. Can give it that touch that makes millions want to buy. Highly experienced in plastic field. Responsible for many of the best selling items now in chain stores. Reply Box C905, Modern Plastics.

FOR SALE: Reconditioned F. J. Stokes Mach. Co. RD-4 rotary 16 punch preform presses, 10 ton pressure; Baker Perkins 15 gal. Vacuum Mixer double arm, jktd; W&P 100 gal. double arm jktd. mixer. PERRY EQUIPMENT CORP., 1529 W. Thompson St., Phila., 21, Pa.

ENGINEER, Mechanical N. Y. extrusion house wants engineer able to design and set up fabricating and cutting tools. Must be able to estimate Costs. This is a permanent position requiring a good, versatile engineer capable of keeping up with a fast-moving industry. Reply Box C906, Modern Plastics.

FOR SALE—INJECTION MOLDS—1—Six Cavity (3 complete soap box mold). 1—Twelve cavity—fluorescent tube socket mold. Molds on premises for inspection. Reply Box C910, Modern Plastics.

(Continued on next page)

PLASTIC ENGINEER WANTED
Position will require man with experience to act as assistant to chief engineer. Should be able to quote on tools and piece part costs, supervise mold design etc. Give all information, experience and salary requirements in first letter. Reply Box C908, Modern Plastics.

EXTRUDER AND MOLDER—Will buy Polyethylene or Polythene any color—1. Virgin material. 2. Reground material. 3. Sheet stock trimmings. 4. Other. Write us formula, quantity, color, and condition. Reply Box C909, Modern Plastics.

WE WILL BUY FOR CASH POLYETHYLENE SCRAP in granular or sheet form for extrusion of filaments and weaving of plastic cloth; also polyvinyl chloride scrap in sheet form clear and colors; acetate, polystyrene scrap, etc. When making offers send samples and details to Box C916, Modern Plastics.

WANTED
MANUFACTURERS REPRESENTATIVE

For completely equipped mid-western injection molding firm,—men must be go getters. Have several Southern, Southeastern, Midwestern and Pacific territories open. Reply Box C911, Modern Plastics.

WANTED: Large or small quantities of clear cellulose acetate two and three mill film in any width rolls, off grade or regular. Reply Box C912, Modern Plastics.

FOR SALE—Can be seen in operation
1—Lester PM-3-B 12 ounce, serial 30 Purchased November 1938. Completely overhauled.
1—Lester PM-2-B 6 ounce, serial 46. Purchased June 1939.
1—HPM 4 ounce #100-H, seral 22138. Purchased October 1939.
Reply Box C922, Modern Plastics.

POLYSTYRENE WANTED. Odd lots, any colors. Virgin and clean reground and clean scrap. Reply Box C913, Modern Plastics.

SACRIFICE—Two Creamer Molds: Individual 1 oz. 5-cavity, ¾ oz. 6-cavity molds for four ounce machine. Molds guaranteed in working order. Article for hotel and restaurant trades and does not fit in with our current line. Samples upon request. Reply Box C914, Modern Plastics.

WANTED
Experienced Plastics Engineer, familiar with injection molding, mold design and extrusion. Prefer engineer with creative ability for proprietary articles. Old established concern with excellent facilities including metal stampings, tool room, assembly, painting, etc. Good position for capable, aggressive man. Reply Box C917, Modern Plastics.

ATTENTION MANUFACTURERS AND SALESMEN: Two top men in injection molding, metal stamping, plant management, assembly, tool and mold building who know how to develop and produce products quickly and cheaply and have practical as well as executive and engineering experience are seeking a new connection. They now are employed in responsible jobs by a large company and desire arrangement or partnership or profit sharing basis only to either reorganize your present plant, erect a new plant or with a top notch salesman, start a new company. Both men are well known in the field and their references are available for full investigations to seriously interested parties. Reply Box C920, Modern Plastics.

MANUFACTURERS REPRESENTATIVES WANTED
Old line midwest molder desires to enlarge sales force. Representatives needed for New England, New York City, St. Louis, Kansas City, Minneapolis, Dallas, Los Angeles. Prefer men with engineering and sales experience. We have complete facilities to design, engineer, build molds, and mold all materials. Commission basis. Reply stating qualifications. Reply Box C919, Modern Plastics.

REBUILT EQUIPMENT FOR SALE
Baker Perkins and Readco Heavy Duty 100-150 gal. Double Arm, Steam Jacketed Mixers.
J. H. Day 75 gal. & 35 gal. Imperial, Double Arm Steam Jacketed, Sigma Blade Mixers.
Stokes and Colton Rotary and Stokes Model T Single Punch Tablet Machines.
Mikro 24", 1-SH and Bantam Pulverizers, Jay Bee, Schutz-O'Neill, Stedman, Williams and Rietz Mills.
Package Machinery FA, FA2, FAQ, Hayssen and Miller Automatic Wrappers.
Huhn, Wolfe and Ellis Steam and Gas Fired Dryers.
Many Other Items of Interest In Stock—Attractively Priced
Tell Us Your Requirements
Union Standard Equipment Co.
318-322 Lafayette Street
New York 12, N. Y.

EXPORTER WITH EXTENSIVE FOREIGN contacts wants to represent manufacturer of small plastic goods. We receive many inquiries from abroad about plastics. Correspondence in English, French, German, Spanish and Italian. Write: Wilbur J. Wright, 206 Jerdel Bldg., Memphis, Tenn.

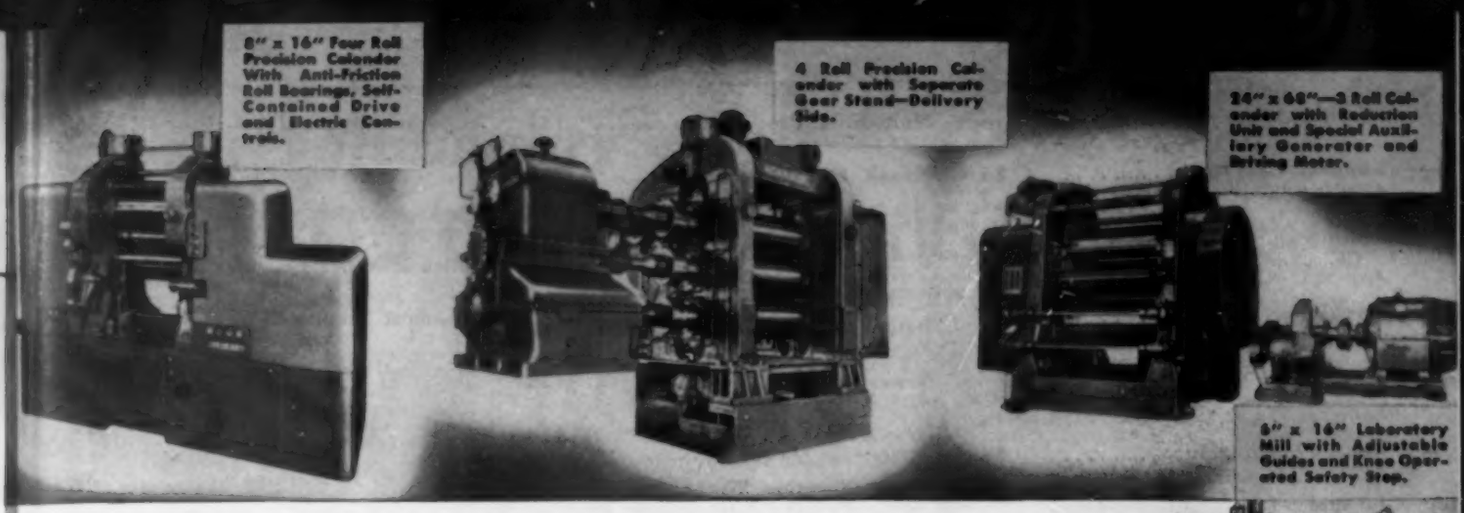
FOR SALE: Small 2 spindle bench drills originally designed and used for drilling umbrella rib tips. Horizontal and vertical spindles drill at same time. Rebuilt and in excellent condition. Price $25.00 each, would cost $250.00 to duplicate one. Reply Box C918, Modern Plastics.

FOR SALE:—Complete Hydraulic Compression Molding Equipment in good condition. 5 Presses 12" Ram complete with Seely Operating Valves, 1 Watson Stillman Hydropneumatic Accumulator, 1 Aldrich Triplex 1" x 3" Pump, 1 Worthington 3½ x 4 Vertical Triplex Pump, 1 Steel Tank ASME 300 lbs. 54" x 96", 2 Steel Tanks 24" x 5' ASME 275 lbs. Reply Box C907, Modern Plastics.

MODERN PLASTICS ADVERTISERS

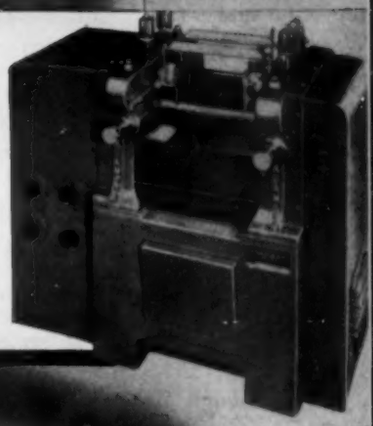
MAY, 1949

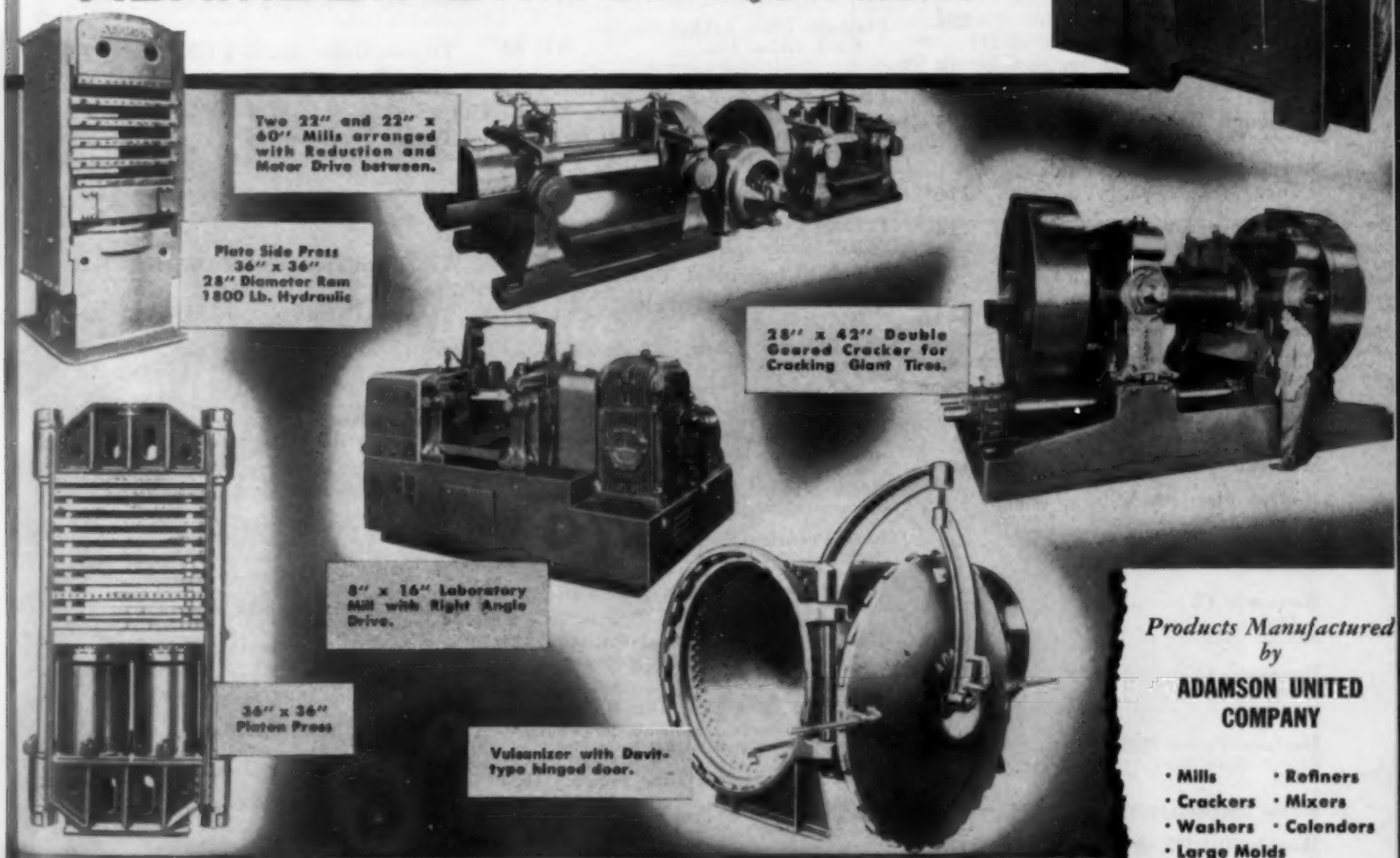
(Please turn to page 160)



For Every Rubber or Plastics Processing Purpose

ADAMSON UNITED EQUIPMENT





We have been building machinery for conventional or special rubber processing requirements for over 50 years, and for the past decade, leading contributors to the development of equipment and processes for the plastics industry.

A program of consistent research, based upon a thorough knowledge of the needs of both industries, has enabled us to pioneer many "firsts" in modern manufacture.

If you contemplate the purchase of additional equipment to meet today's unusual demands, or if you are faced with the problem of creating new processes for unusual product requirements, consult us.

The experience and abilities of our engineers are at your service.

Products Manufactured by

ADAMSON UNITED COMPANY

- Mills
- Refiners
- Crackers
- Mixers
- Washers
- Calenders
- Large Molds
- Pot Heaters
- Vulcanizers
- Autoclaves
- Hydraulic Presses
- Multi-Platen Presses
- Automatic Curing Presses
- Belt Curing Presses
- Compression Molding Presses
- Plywood Presses
- Auxiliary Equipment

ADAMSON UNITED COMPANY

AKRON 4, OHIO

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(Continued from page 158)

A BRESKIN PUBLICATION

MODERN PLASTICS

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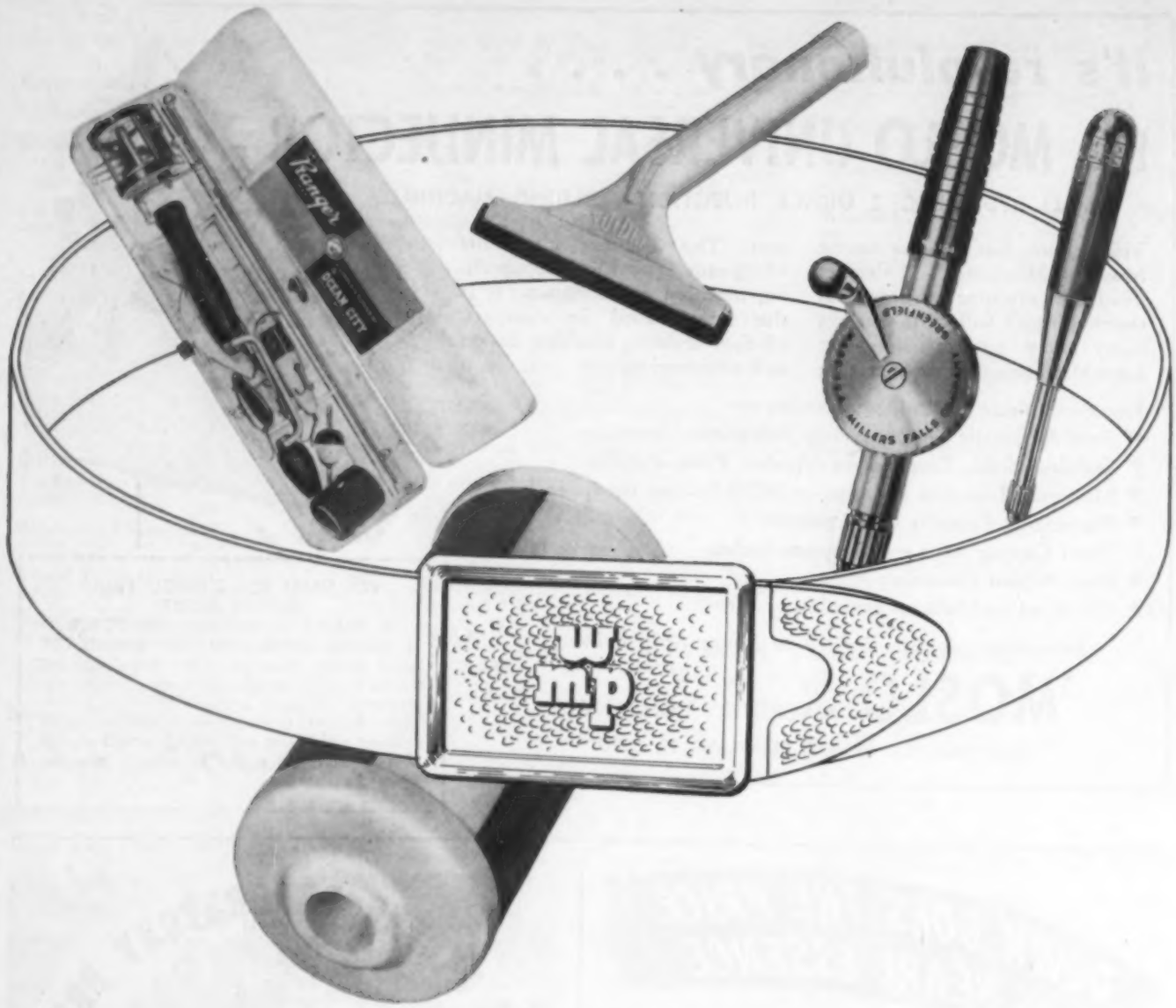


TUCKED UNDER OUR BELT

Quality custom injection moulding depends largely upon the experience and the facilities of the moulder. Manufacturers who call on Worcester Moulded find we have plenty of both tucked under our belt. And tucked away in our minds is the experience we've gained from the successful design and fabrication of hundreds of plastic products.

If you are planning to apply plastics to a new product or to plastically revamp an old one, let us put this experience to work for you and pay you a handsome dividend in prompt, satisfactory service.

wmp

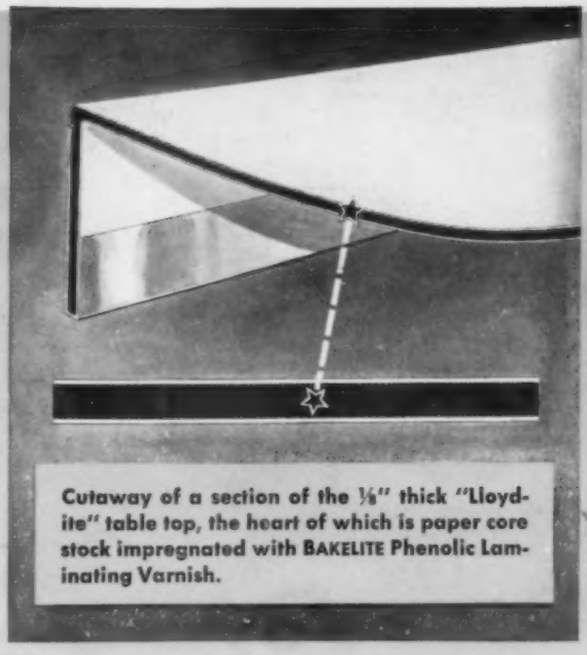
Custom Injection Moulding

WORCESTER MOULDED PLASTICS CO.

14 HYGEIA STREET, WORCESTER 8, MASS.

17 East 42nd St., New York 17, N. Y.

Plastic all the way through, the top of this Lloyd kitchen table resists cigarette burns, alcohol, fruit acids, boiling water and abrasion.



Cutaway of a section of the ⅛" thick "Lloydite" table top, the heart of which is paper core stock impregnated with BAKELITE Phenolic Laminating Varnish.

Formed under heat and pressure, "Lloydite" table tops are reinforced with welded square steel tubing to remove any possibility of warping, and give a solid anchor to the legs.

Are You Thoroughly Up-to-date on PLASTIC LAMINATES?

Quick cure, low cost, fast production, and high strength. These are achieved by The Lloyd Manufacturing Company in their "Lloydite" all-plastic kitchen table tops—because they use BAKELITE Phenolic Laminating Varnishes for the core stock.

After simple impregnation of paper stock with the resins, the tops are heat-and-pressure molded *in one operation*, during which the "waterfall" edges and corners are formed and trimmed. The results: beauty that sells tables . . . and durability that makes them last and last!

But this is only one type of plastic laminate now made from BAKELITE Laminating varnishes. Other types based on paper and fabrics such as duck, linen, and glass cloth are made in many grades with required properties for industrial uses such as gears, pulleys, electrical insulators, spinning pots, chemical equipment parts—for radio and instrument dials, and many other consumer and industrial items.

Have you a problem involving decorative applications such as furniture tops and wall paneling—or industrial applications requiring superior dielectric properties, high mechanical strength, chemical resistance, machineability? Then we'd like to help bring you up to date on plastic laminates. Write Dept. J-13 for names of laminators who supply the finished laminates in the various grades. For prompt service we suggest that your inquiry be accompanied by sketches, blueprints, and detailed specifications.

Some of the *Features* provided by BAKELITE Phenolic Varnishes for laminated core stock

- High tensile, flexural, and compressive strengths.
- Ease and speed of treating core stock.
- Low water absorption..
- Corrosion resistance.
- Wear and abrasion resistance.
- Low cost, economical production.
- Lightness in weight.

Bakelite TRADE-MARK Phenolic LAMINATING PLASTICS

BAKELITE CORPORATION

BAKELITE CORPORATION, *Unit of Union Carbide and Carbon Corporation* UCC 30 East 42nd Street, New York 17, N. Y.

• ENGINEERED IN PLASTICS BY GENERAL ELECTRIC

Put plastics in your picture

• Where do plastics fit into *your* sales picture? Plastics parts, molded by General Electric for the new Argoflex "75," contribute several features which help to make this camera click with the customers. Yet these mass-produced plastics parts simplified assembly operations and reduced production costs.

G-E engineers worked closely with Argus in the design of this camera to take full advantage of the benefits plastics could provide. The black phenolic outer case resists scratching; never needs refinishing. And the stability of phenolics assures snug-fitting parts that won't warp to admit light.

General Electric's *complete* plastics service can design, engineer, and mold plastics parts to meet *your* requirements. Find out how this valuable service may cut your costs, improve your product. Write: Plastics Division, Chemical Department, General Electric Company, 1 Plastics Avenue, Pittsfield, Mass.

GENERAL ELECTRIC'S *COMPLETE* PLASTICS SERVICE

General Electric has facilities for designing, engineering, and molding *any* plastics job. This means (1) skilled personnel prepared to focus over 50 years of plastics research upon *your* problem; (2) all types of plastics available; we can select, without bias, the best one for your job; (3) all types of molding methods: compression, injection, extrusion, transfer—also high-pressure laminating and fabricating; (4) G-E Quality Control—a byword in industry—involving as many as 160 inspections for a single plastics part.

EVERYTHING IN *Plastics*

You can put your confidence in—

GENERAL ELECTRIC

CD40-A43

General Electric plastics factories are located in Coshocton, Ohio, Decatur, Ill., Taunton and Pittsfield, Mass.